



LAKE COUNTY

CLIMATE ADAPTATION PLAN

PUBLIC HEARING DRAFT | DECEMBER 2025



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ACKNOWLEDGMENTS

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This project is funded by the Governor's Office of Land Use and Climate Innovation (LCI), formerly known as the Office of Planning and Research (OPR), through the California Adaptation Planning Grant Program (APGP).



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LIST OF ABBREVIATIONS

AB: Assembly Bill

ADA: Americans with Disabilities Act

APGP: Adaptation Planning Grant Program

CAL FIRE: California Department of Forestry and Fire Protection

Cal OES: California Governor's Office of Emergency Services

CalVTP: California Vegetation Treatment Program

CAP: Climate Adaptation Plan

CEQA: California Environmental Quality Act

CWPP: Community Wildfire Protection Plan

CVA: Climate Vulnerability Analysis

HEPA: high-efficiency particulate air

HVAC: heating, ventilation, and air conditioning

LHMP: Local Hazard Mitigation Plan

OES: Lake County Office of Emergency Services

PG&E: Pacific Gas and Electric

PSPS: Public Safety Power Shutoff

RCD: Lake County Resource Conservation District

SB: Senate Bill

SR: State Route

TERA: Tribal EcoRestoration Alliance

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INTRODUCTION

Purpose

The Lake County Climate Adaptation Plan provides a framework to reduce climate-related risks and build community resilience countywide. The County of Lake (the County), City of Clearlake, and City of Lakeport developed this plan through the Lake County Community Risk Reduction Authority’s “Planning for an Equitable Climate-Safe Lake” project, funded by the California Adaptation Planning Grant Program.

In 2023, the California Governor's Office of Land Use and Climate Innovation awarded the County of Lake and its partners, the Lake County Community Risk Reduction Authority, Lake County Resource Conservation District, and Lake County Fire Safe Council, an Adaptation Planning Grant to support the Equitable Climate-Safe Lake project. The Equitable Climate-Safe Lake project aims to create and leverage an inclusive collaboration and existing risk planning documents to create a strategic countywide climate adaptation plan, implement several actions from the Multi-Jurisdictional Hazard Mitigation Plan, and empower Lake County residents to survive and thrive in a changing environment. The project has included development of a Countywide Climate Vulnerability Analysis, Countywide Evacuation Study, and this Climate Adaptation Plan.

The air, lands, and waters of Lake County hold profound cultural, historical, and spiritual significance to local Tribes, including those with ancestral and contemporary ties to Clear Lake and its surrounding watershed. The County acknowledges that effective climate adaptation planning must reflect collaborative relationships with Tribal governments to ensure that hazard mitigation, emergency preparedness, and climate adaptation efforts respect and protect Tribal cultural resources, traditional ecological knowledge, and community well-being.

The Lake County Community Risk Reduction Authority, formed through a joint powers agreement in 2018 and updated in 2019, brought together the County, City of Clearlake, and City of Lakeport; the Lakeport, Northshore, South Lake, Kelseyville, and Lake County Fire Protection Districts; the Clearlake Oaks, Cobb

Climate Change in Lake County

Lake County experiences a range of climate-related hazards that affect its communities, economy, and natural resources. Wildfires have burned over 70 percent of the county since 2015, including the Valley Fire, Jerusalem Fire, Rocky Fire, Clayton Fire, Sulphur Fire, Pawnee Fire, Mendocino Complex Fire, and August Complex Fire. Drought conditions periodically stress water supplies from Clear Lake and groundwater sources that serve domestic, agricultural, and emergency needs. Severe storms cause flooding, trigger landslides, and damage infrastructure. These hazards, along with extreme temperatures, agricultural pests and diseases, and degraded air quality from wildfire smoke, create challenges in the daily lives of residents, businesses, and local governments. Climate change will likely increase the frequency and intensity of these hazards, with projections indicating increased wildfire activity, more extreme heat days, and changing precipitation patterns in coming decades.

Source: Cal-Adapt. 2024. Annual Averages. <https://cal-adapt.org/tools/annual-averages/>.

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Area, Lower Lake, and Callayomi County Water Districts; the Lake County Watershed Protection District; and four Tribal governments—Habematolel Pomo of Upper Lake, Middletown Rancheria of Pomo Indians, Scotts Valley Band of Pomo Indians, and Robinson Rancheria of Pomo Indians of California. This diverse partnership, representing jurisdictions across the county, applied together and secured funding for the Planning for an Equitable Climate-Safe Lake project in 2023, demonstrating the collaborative approach that made this planning effort possible. This Climate Adaptation Plan continues that collaboration by providing a shared framework for building resilience across jurisdictions and sectors throughout Lake County.

Lake County's Office of Climate Resiliency adopted the Pillars of Landscape Resilience framework in 2022 from the Tahoe-Central Sierra Initiative. The framework addresses resilience through 10 interconnected pillars:

- Air quality
- Biodiversity conservation
- Carbon sequestration
- Economic diversity
- Fire-adapted communities
- Fire dynamics
- Forest resilience
- Social and cultural well-being
- Water security
- Wetland integrity



Each pillar provides metrics for measuring progress toward ecosystem and community resilience. This Climate Adaptation Plan uses the Pillars of Landscape Resilience to organize adaptation framework.

The Climate Adaptation Plan aims to:

- Reduce climate risks for all residents and businesses, with focus on the most vulnerable communities.
- Strengthen coordination among service and infrastructure providers to maintain essential services.
- Preserve and restore natural systems that provide ecosystem services.
- Promote economic resilience and diversification.
- Integrate traditional ecological knowledge and tribal knowledge into existing and future resilience programs.
- Enhance local capacity through education, training, and partnerships to support ongoing adaptation efforts.

Community Profiles

Lake County is in the north-central part of California, directly north of the San Francisco Bay Area and surrounded by the counties of Glenn, Colusa, Yolo, Napa, Sonoma, and Mendocino. Primary access to the county is provided by State Route (SR-) 29 traveling north from Napa County, SR-175 and SR-20 traveling east from Mendocino County, and SR-20 traveling west from Colusa County. The county covers approximately 1,329 square miles, 73 square miles of which consist of water, most notably Clear Lake, which is the largest natural lake wholly within California. Lake County has a population of approximately 67,000,¹ which significantly increases in the summer due to seasonal visitors participating in outdoor recreation and tourism.

The county is home to a diverse set of ecosystems and habitats due to the diverse topography, ranging from Snow Mountain East, a 7,055-foot peak in the Berryessa Snow Mountain Wilderness National Monument, to Cache Creek and Putah Creek that flow into the Sacramento River. Volcanic features, such as the Clear Lake Volcanic Field, have shaped the topography into a series of mountains and valleys, forming numerous lakes and forests throughout the landscape.

The land in Lake County is owned and managed by a mix of federal, tribal, state, and local governments and nonprofit and private individuals and organizations. The County of Lake, the City of Clearlake, and the City of Lakeport own and manage land in the unincorporated and incorporated areas of the county. The U.S. Forest Service owns the largest portion of land through the Mendocino National Forest and co-manages the Berryessa Snow Mountain National Monument with the Bureau of Land Management. The Bureau of Land Management and State of California own and manage several open space areas, such as South Cow Mountain Off-Highway Vehicle Recreation Area, Boggs Mountain Demonstration State Forest, and Clear Lake State Park. Though not a government entity, the Lake County Land Trust manages public lands throughout the county, including preserves, conservation easements, Monitor Island, and the Rodman Nature Center.

The County and the Cities of Clearlake and Lakeport will implement this Climate Adaptation Plan in partnership with federal and State agencies; landowners; and community partners. The following sections provide a community profile for each of the three local jurisdictions in the plan area.

Unincorporated Lake County

The unincorporated areas are across Lake County, connected by SR-20, SR-53, SR-29, SR-175, SR-281; other major roads such as Butts Canyon Road, Morgan Valley Road, and Scotts Valley Road connect the more rural areas of the county. Transit service is limited, with Lake Transit providing bus service around Clear Lake and between unincorporated communities in southern Lake County.

Land uses in the unincorporated county are rural in nature but vary widely—from agricultural lands and forests outside of communities; to parks and open spaces surrounding Clear Lake, Lake Pillsbury, and Indian Valley Reservoir; to residential and commercial areas in communities such as Cobb, Lucerne, and North Lakeport. The agricultural land uses support the thriving agriculture economy, with major crops including wine grapes and pears, as well as cannabis, livestock such as poultry, and timber.² The parks and open space areas provide a foundation for a robust outdoor recreation and tourism economic sector, especially in the summer months. Visitors travel to the county to take part in water recreation activities on Clear Lake, hiking and bicycling on local, State, and federal lands, and camping at the dozens of tents and

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recreation vehicle campsites across the county. Agricultural lands across Lake County also support agritourism and resort activities. The County's geothermal resources in the southern region, including The Geysers geothermal field, attract visitors interested in renewable energy tourism, hot springs, and support related recreational and educational facilities. The commercial and residential areas of the unincorporated county host local businesses and services for both residents and visitors.

The socioeconomic and demographic profile of Lake County presents a diverse population with unique social and economic characteristics. According to the 2022 American Community Survey, unincorporated Lake County is home to 46,398 people with a median age of 44 years and a median household income of approximately \$56,260.³ The population includes a significant proportion of older adults (65 years and older), who make up 25 percent of the community compared to 14 percent statewide, while children under the age of 18 account for 21 percent.⁴ Despite the thriving agriculture and tourism economy, the unincorporated county faces notable challenges, including a poverty rate of 17 percent and 21 percent of the population living with a disability, compared to 4 percent of California's population.^{5, 6} Transportation and connectivity issues are also prominent, with 9 percent of residents lacking access to a vehicle compared to 7 percent statewide, and 19 percent of households without internet access compared to 7 percent statewide.^{7, 8} Housing insecurity is also evident, with 290 individuals experiencing homelessness and 26 percent of households living in rental accommodations.⁹

As shown in **Figure 1**, the County divides the unincorporated areas into eight planning areas:

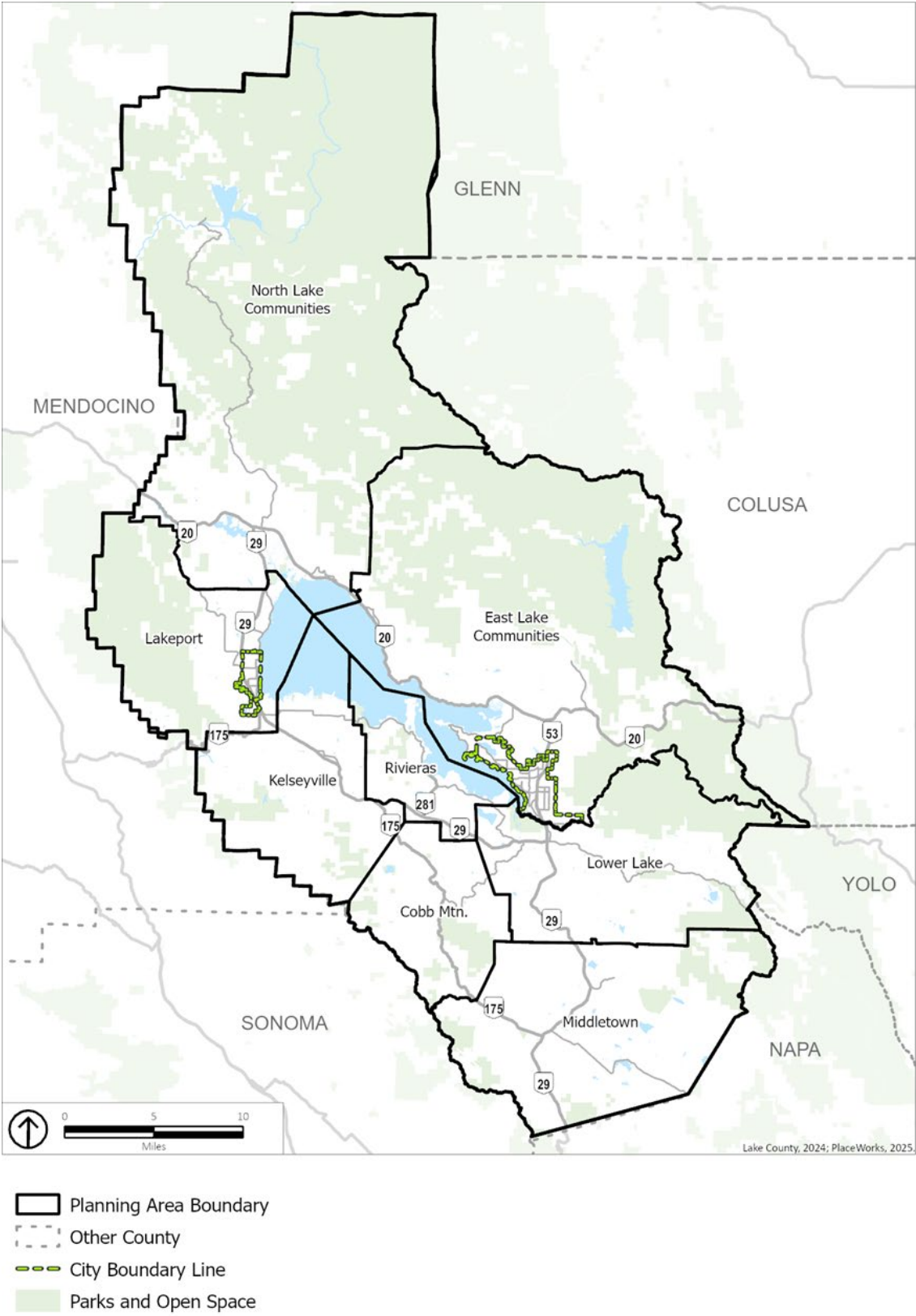
- **Cobb Mountain Area.** The Cobb Mountain Area encompasses 74 square miles of the mountainous territory in southwestern Lake County, with vehicle access to the area provided by SR-175. The unincorporated communities of Cobb, Loch Lomond, Pine Grove, Seigler Springs, and Whispering Pines are the primary population centers, hosting various mountain resorts, hot springs, geothermal steam fields, and Cobb Mountain. Outside of these communities, the Planning Area primarily consists of rural, resource conservation, and some agricultural land.
- **Kelseyville Area.** The Kelseyville Area covers 75 square miles in western Lake County, with vehicle access provided by SR-29 and Soda Bay Road. The unincorporated communities of Finley and Kelseyville are the primary population centers, providing housing and commercial areas that support the rural agricultural lands. The area is known for producing walnuts and wine grapes. The Kelseyville community is home to numerous retail shops and is near Clear Lake State Park, which includes a visitor's center, camping, boating, hiking, and swimming facilities. Outside of these communities, the Planning Area is primarily made up of agricultural, rural, and resource conservation land.
- **Lakeport Area.** The Lakeport Area covers 101 square miles of land, stretching from the city limits of Lakeport to the North Lake Communities Area. SR-29, SR-175, and Scotts Valley Road provide vehicle access to the area. This area is home to the county seat in the City of Lakeport and to the unincorporated community of North Lakeport. North Lakeport consists of primarily residential subdivisions, several mobile home parks, and scattered commercial development. Sutter Lakeside Hospital and several medical offices provide medical services to the community countywide. Outside of North Lakeport, the Planning Area is primarily made up of agricultural, rural, public, and resource conservation land.
- **Lower Lake Area.** The Lower Lake Area is in the southeastern portion of Lake County, covering 119 square miles of land. SR-29, SR-53, and Morgan Valley Road provide vehicle access to the area. Lower Lake is the only established community in the Planning Area. Outside of Lower Lake, the Planning Area is primarily made up of agricultural, rural, and resource conservation land.

- **Middletown Area.** The Middletown Area is in the southernmost portion of Lake County, covering 148 square miles of land, with vehicle access provided by SR-29, SR-175, and Butts Canyon Road. The primary population center is the unincorporated community of Middletown. Other unincorporated communities in this area include Anderson Springs, a set of hot springs and a resort; Hidden Valley, a residential and recreation area adjacent to Hidden Valley Lake; and Harbin Springs, a set of three springs turned into a resort in the late 1800s. This area is also home to livestock ranches, vineyards, and the Geysers Geothermal Field. Outside of these communities, the Planning Area is primarily made up of agricultural, rural, and resource conservation land.
- **Rivieras Area.*** The Rivieras Area is along the western shores of Clear Lake, covering 28 square miles of land. SR-29, SR-281, Soda Bay Road, and Point Lakeview Road provide vehicle access to the area. This local planning area primarily supports residential; scattered commercial uses; and recreation such as boating, fishing, picnicking, and swimming associated with Clear Lake. Unincorporated communities in the Rivieras Area include Buckingham, Kelseyville Riviera, Riviera Heights, Riviera West, and Soda Bay. Outside of these communities, the Planning Area primarily consists of open space lands reserved for recreation and conservation, as well as agricultural and rural lands.
- **East Lake Communities Area.** The East Lake Communities Area covers nearly 300 square miles of land in the eastern portion of the county. SR-20 and SR-53 provide primary vehicle access to the area, including the City of Clearlake. Unincorporated communities in this area include Clearlake Oaks, Double Eagle Ranch, Glenhaven, Kono Tayee, Paradise Valley, and Spring Valley. Many of these communities support housing in the unincorporated county, as well as lodging and retail for tourism and county parks and campgrounds for outdoor recreation. Outside of these primarily residential communities, much of the East Lake Communities Planning Area consists of publicly accessible recreational land, including a large portion of Mendocino National Forest in the northwestern part of the Planning Area.
- **North Lake Communities Area.** The North Lake Communities Area is the largest planning area, covering 470 square miles of land, much of which is in the Mendocino National Forest. SR-20 and SR-29 provide primary vehicle access to the area. Unincorporated communities in this area include Bachelor Valley, Blue Lakes, Lake Pillsbury, Lucerne, Nice, Saratoga Springs, Upper Lake, and Witter Springs. Many of these communities consist of resorts, campgrounds, and lodges due to natural springs and the formation of Scott Dam in northern Lake County. The unincorporated communities of Lucerne, Nice and Upper Lake are the main population centers, providing homes, retail and commercial areas, and parks for both residents and visitors. Outside of these communities, the Planning Area consists of agricultural, rural, public, and resource conservation land.

* Although the Rivieras Area shares a ZIP code and supervisorial district with Kelseyville, the Lake County 2050 General Plan identifies it as a separate planning area to reflect its distinct identity and development characteristics.

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Figure 1 Lake County Area Plan Boundaries



City of Clearlake

The City of Clearlake is a community of approximately 16,500 people along the southeastern shore of Clear Lake and bordered by the unincorporated communities of Clearlake Oaks to the north, Lower Lake to the south, and rural unincorporated Lake County to the east. SR-53 provides vehicle access through the city, connecting the agricultural lands in southern Clearlake with residential areas in the center of the city and agricultural and low-density residential areas in the northern part of the city. Lake Transit Authority operates four routes through the city, connecting education centers, healthcare facilities, government offices, and retail centers. The lakeshore areas of the city consist primarily of homes, lodging, and parks, such as Redbud Park and Austin Park. The northwestern part of the city contains Borax Lake, which is a National Historic Landmark. Other important ecosystems in the city include aquatic and wetland habitats along the Clear Lake lakeshore, riparian areas along Cache Creek, forested areas covered in oak-madrone forests and chaparral, and grasslands and shrublands scattered throughout the city.

Clearlake has a diverse economy supported by outdoor recreation, agriculture, tourism, education, healthcare, and government services. The tourism and recreation industry is driven primarily by the proximity of Clear Lake, which draws visitors to fishing, boating, and water sports. This supports the large retail establishments such as Safeway, Food Etc., and Grocery Outlet and the recreational vehicle (RV) parks and other lodging near the lakeshore. Healthcare and social assistance through Adventist Health Clearlake, Lake County Tribal Health South Shore facility, and the Veteran's Clinic are the largest economic industries in the city and provide essential services to the community. Woodland Community College – Lake County Campus provides both employment opportunities and workforce development for residents in the area.

Although a vibrant recreation and tourism destination, Clearlake faces many socioeconomic challenges. According to the 2022 American Community Survey, the city has a median household income of \$41,047, which is less than the surrounding unincorporated county, and an unemployment rate of 8 percent, which is 3 percent higher than the county's unemployment rate.¹⁰ Over 24 percent of people in Clearlake are in poverty, which is much higher than the rest of Lake County.¹¹ The median age in Clearlake is 39 years old, indicating a younger population, although 21 percent of the population identifies as having at least one disability.^{12, 13} However, due to the more urban nature of the city compared to the rest of the county, only 11 percent of the population does not have access to internet, compared to 19 percent of the county's population.¹⁴

City of Lakeport

The City of Lakeport, the county seat, is a small community of approximately 5,000 people along the western shore of Clear Lake. The city is bounded by the unincorporated North Lakeport community to the north, Clear Lake to the east, the unincorporated Finley community to the south, and agricultural lands and Scotts Creek to the west. SR-29 and SR-175 provide vehicle access to the city, and Lake Transit Authority provides transit via four routes that connect residents to other areas of the county as well as to Ukiah in Mendocino County.

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Lakeport features a mix of residential, commercial, agricultural, recreational, and public land uses that reflect its rural and community-centered nature. Residential areas, mainly consisting of single-family homes, dominate the city, with lakefront properties offering access to Clear Lake. The central commercial district, located along Main Street, includes local shops and services, while larger businesses are found along SR-29. Lakeport is also rich in biological resources: Clear Lake is home to abundant fish species, and surrounding areas feature diverse ecosystems, such as wetlands, oak savannah woodlands, chaparral, conifer and deciduous forests, grasslands, oak woodland, and riparian areas.

Lakeport supports approximately 45 percent of all jobs in Lake County, with most Lake County government offices located in the city.¹⁵ Agriculture and viticulture are key components of the local economy, with extensive vineyards alongside diverse crops such as fruits, nuts, and livestock, all integral to the community. Healthcare is also a major contributor to the local economy, with facilities like Sutter Lakeside Hospital and Lake County Tribal Health Consortium providing employment and essential services. The commercial base is spread throughout multiple shopping centers, small nodes, and stand-alone businesses, with six main business centers, including the historic downtown area. Tourism is vital due to the city's location on Clear Lake, attracting visitors to outdoor activities like boating and fishing.

According to the 2022 American Community Survey, Lakeport has a median household income of \$61,100, which is higher than that of the surrounding unincorporated areas and the city of Clearlake.¹⁶ The city's unemployment rate is 2 percent, which is 4 percent lower than the county's unemployment rate. Approximately 11 percent of Lakeport residents live in poverty, significantly less than the rest of Lake County.¹⁷ The median age in Lakeport is 43, indicating a younger population compared to the surrounding unincorporated areas of Lake County.¹⁸ About 17 percent of the population reports having at least one disability, which is also lower than the county average.¹⁹ Due to its more urban nature, only 10 percent of Lakeport's population lacks internet access, compared to 19 percent in the rest of Lake County.²⁰

Regulatory Framework

Climate adaptation planning in California happens within a regulatory framework that guides local jurisdictions in addressing climate risks and building community resilience. Though State law does not require climate adaptation plans, the General Plan Safety Element must address several of the topics of a climate adaptation plan. The State provides several tools and guidance documents to assist local jurisdictions to increase community resilience, such as the California Adaptation Planning Guide and Cal-Adapt.org. These guidance documents and tools provide important resources to support effective adaptation planning at all levels of government. The following sections describe the primary State regulations and tools guiding local adaptation planning.

California Adaptation Strategy

The State of California catalogs state-level climate adaptation efforts in its Climate Adaptation Strategy, which is updated every three years as mandated by AB 1482 (2015).²¹ The 2024 California Climate Adaptation Strategy organizes State resilience efforts around six climate resilience priorities.

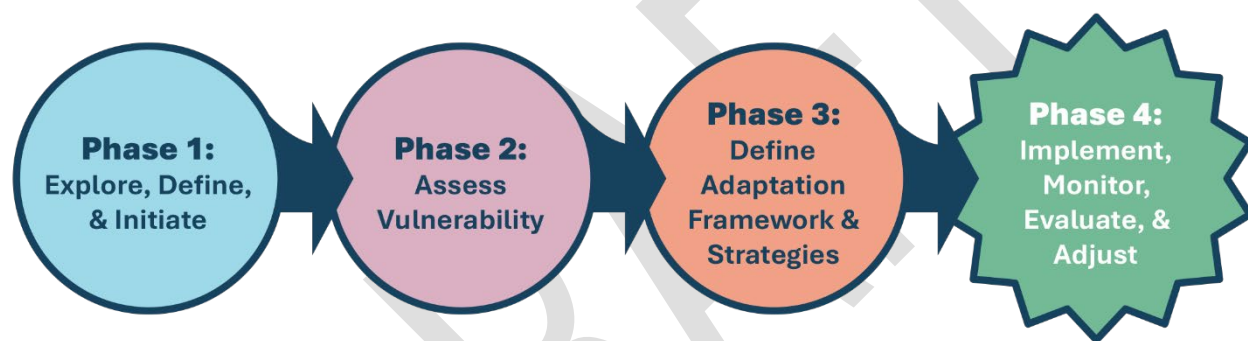
1. Strengthening protections for climate vulnerable communities.
2. Protecting public health and safety.
3. Building a climate resilient economy.
4. Accelerating nature-based climate solutions.

5. Making decisions based on the best available climate science.
6. Leveraging resources for climate action.

California Adaptation Planning Guide

The Governor's Office of Land Use and Climate Innovation provides technical guidance through the California Adaptation Planning Guide, which serves as the primary resource for local governments conducting climate vulnerability assessments and developing adaptation strategies.²² The guide emphasizes an integrated approach that considers social equity, economic impacts, and ecosystem health throughout the planning process. The Adaptation Planning Guide sets out a step-by-step framework for integrating climate adaptation into local planning processes. The guide recommends a four-phase process, as shown in **Figure 2**: 1) exploration and initiation, 2) conducting a vulnerability assessment, 3) defining adaptation strategies, and 4) establishing implementation and monitoring approaches. The guide emphasizes the importance of equity and community engagement in all phases of adaptation planning to ensure resilience efforts are technically sound and responsive to the needs of vulnerable populations.

Figure 2 California Adaptation Planning Guide Process



Senate Bill 379

California Senate Bill 379, codified in California Government Code Section 65302(g)(4), requires all cities and counties to prepare a climate change vulnerability assessment and integrate climate adaptation and resiliency into safety elements of their general plans.²³ The law specifically requires communities to consider methods for avoiding or minimizing climate impacts on new development, guidelines for siting essential public facilities outside of hazard areas when feasible, and approaches for coordinating with other agencies at all levels of government.

These State priorities align with Lake County's "Pillars of Landscape Resilience" framework, providing consistency between local and State adaptation efforts. The State strategy emphasizes procedural equity through meaningful community engagement and distributional equity through prioritized investments in vulnerable communities, principles reflected throughout this plan.

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Plan Preparation

The Lake County Climate Adaptation Plan represents a collaborative effort to build community resilience. This section summarizes the steps for developing this Climate Adaptation Plan, including community outreach and engagement throughout the process.

Lake County followed the California Adaptation Planning Guide's four-phase process to develop this plan systematically and comprehensively, as outlined in **Figure 2**. Central to this effort was the completion of the Climate Vulnerability Analysis, which provided the technical foundation. The analysis examined seven climate hazards affecting Lake County and identified 14 populations and community features most vulnerable to these hazards. The vulnerability analysis combined exposure data, sensitivity factors, and adaptive capacity to prioritize where adaptation efforts would have the greatest impact on reducing climate risks. The planning process also incorporated extensive mapping of hazard exposure areas, demographic analysis to identify frontline communities, and assessment of existing county resources and programs that could support adaptation efforts. This comprehensive approach ensured that the resulting strategies address the specific vulnerabilities identified in Lake County while building on existing community strengths and initiatives.

Integration with Lake County 2050

The Climate Adaptation Plan was developed concurrently with the Lake County 2050 General Plan Update, creating opportunities for integrated planning and community engagement. This coordination ensures climate adaptation considerations are embedded throughout county planning documents, particularly in the Health and Safety Element, which must address climate adaptation per SB 379. The concurrent planning processes also allow for shared resources and unified community outreach, reducing engagement fatigue while maximizing public participation opportunities.

Community Engagement Activities

Community engagement helped form the foundation of this planning effort, with activities designed to reach all segments of Lake County's diverse population. The engagement process focused on historically marginalized communities and those facing barriers to traditional participation methods. Outreach activities relied on existing meetings, events, and processes to receive community feedback, including coordination with the Lake County 2050 General Plan Update, extensive tribal engagement, and attending Municipal Advisory Council meetings.

Recognizing that traditional meeting formats may not reach all community members, the planning process employed multiple engagement strategies. These included pop-up events at existing community gatherings, paper surveys distributed to residents without internet access, and use of KPFZ 88.1 Lake County Community Radio to reach senior residents and those in remote areas. Marketing materials maintained consistent branding for easy recognition, with distribution through multiple channels, including social media, press releases, and flyers at community centers. This collaborative approach ensured the Climate Adaptation Plan reflects diverse perspectives, builds upon existing initiatives, and creates shared ownership for implementation. During public review of the Climate Vulnerability Analysis and during the development of the Climate Adaptation Plan (August to November 2025), the project team conducted extensive, adaptation focused, engagement activities, including meetings with the local government agencies, interested parties, Tribes, and advisory bodies.

County of Lake General Plan Update Engagement (2024 to 2025)

The Lake County 2050 General Plan Update (Lake County 2050) included comprehensive community engagement efforts that also informed climate adaptation planning. Activities included formation of a General Plan Advisory Committee, three rounds of community meetings for each of the eight Local Area Plans, stakeholder focus groups, and two online surveys. The project website serves as a central hub for information, meeting schedules, and document access.

The first community survey was in early 2024 and gathered input from 718 residents across all eight Local Area Plans. This 15-question survey assessed quality of life, natural and human-caused hazards, and environmental justice issues. The survey included three climate adaptation-related questions, asking residents about the hazards of most concern to them, how informed community members are about emergency preparedness, and how they felt about evacuations.

The County Board of Supervisors appointed the General Plan Advisory Committee (GPAC) to support the Lake County 2050 General Plan update. The project team also asked the GPAC to provide feedback on climate vulnerabilities and adaptation. The first meeting was on March 15, 2024, and introduced members to the project and the Climate Adaptation Plan. The second meeting took place on June 28, 2024, and members reviewed key issues identified through community engagement, including climate change adaptation topics such as potable water supply, Clear Lake water quality and quantity, regenerative agriculture practices, green stormwater infrastructure, and features for offsetting extreme heat.

Throughout 2024, the County hosted discussions with three focus groups with interested parties to address specific topics of countywide concern: environmental justice, Spanish-speaking community members, and agriculture. The environmental justice focus group discussed the most vulnerable populations in Lake County. The Spanish-speaking meeting discussion focused on key environmental justice topics and the challenges facing their community. The agriculture-focused meeting discussion included talking with farmers and landowners about how climate change is likely to affect the economic viability of their businesses.

Tribal Consultation and Engagement

Lake County conducted government-to-government consultation with State- and federally recognized Tribes in Lake County. After reaching out to 26 Tribal Nations, the project team was able to conduct direct consultation discussions online with 6 tribes, including Big Valley Band of Pomo Indians (February 10, 2025), Elem Indian Colony of Pomo Indians of the Sulphur Bank Rancheria (December 2, 2024), Habematolel Pomo of Upper Lake (September 6, 2024), Koi Nation of Northern California (October 23, 2024, and January 6, 2025), and Robinson Rancheria of Pomo Indians of California (November 15, 2024). The team also conducted email correspondence with a representative of Scotts Valley Band of Pomo Indians. While the intention of these meetings was to meet Senate Bill 18 requirements, the project team expanded the discussion questions asked to include:

- What hazards are of most concern to your Tribe and your Tribal members?
- Which Tribal members, Tribal resources, natural resources, community buildings, infrastructure, or services do you see as more or most vulnerable to climate change hazards?
- What practices has your Tribe historically conducted to reduce harm from hazard events?

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Through these consultation meetings, several Tribal priorities emerged. Tribes emphasized the importance of protecting burial sites, ancestral artifacts, and culturally significant viewsheds, with a strong preference for avoiding disturbance rather than removal of cultural resources. Tribal representatives requested adequate consultation timeframes of 30 to 35 days and stressed the need for indigenous representation on County committees and in decision-making processes.

Local Tribes are particularly concerned about the impacts of climate-related hazards on ancestral lands, traditional food sources, and culturally significant plants and wildlife. Wildfires, drought, flooding, and pest outbreaks threaten not only agricultural productivity but also Tribe access to traditional gathering areas, medicinal plants, and ceremonial resources. Smoke and heat hazards affect both Tribal members working in agriculture and the broader community. Several Tribes operate their own prescribed and cultural burning programs to reduce wildfire risk and restore ecological function. Tribes also identified housing challenges, particularly for younger Tribal members aged 18 to 29 who face limited options, and aging housing stock not equipped for modern energy resilience measures like solar power and backup generators.

Cultural resource protection remains paramount, with Tribal representatives noting that archaeologists estimate only 5 percent of tribal cultural resources in Lake County are currently documented. Tribes expressed the need for stronger coordination on development projects, particularly those proceeding under California Environmental Quality Act (CEQA) exemptions, and emphasized the importance of enforcing County requiring, including mitigation measures for new development. The Koi Nation, Habematolel Pomo, and Robinson Rancheria have established a Memorandum of Understanding (Ancestors One) with the County to coordinate on cultural resource protection.

Tribes emphasized the importance of integrating traditional ecological knowledge, culturally informed land stewardship practices, and Tribal consultation into climate adaptation, wildfire mitigation, and water management strategies to ensure protection of cultural resources and resilience of Tribal lands and livelihoods.



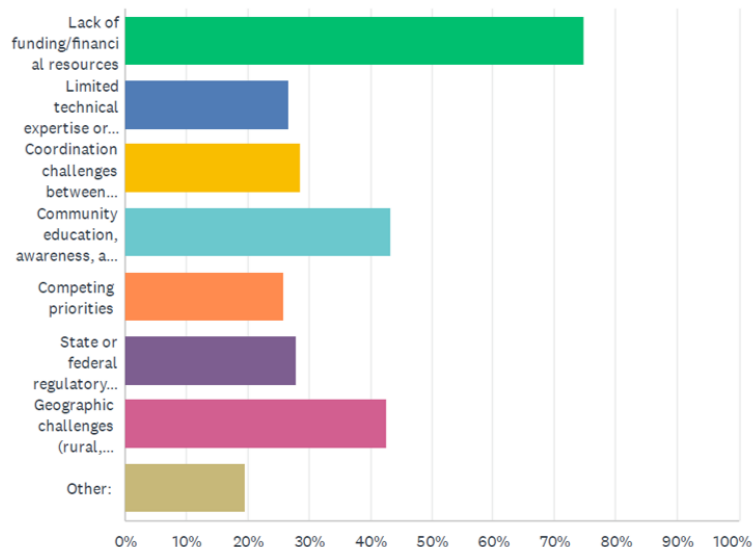
Climate Vulnerability Analysis Survey

Following completion of the Climate Vulnerability Analysis, Lake County launched the Climate Vulnerability Analysis Survey on August 18, 2025, with the survey period extending through September 22, 2025. This seven-question survey was designed to receive input on the vulnerability analysis findings and community resources and barriers to adaptation, and to gather ideas for building climate resilience. The survey asked residents to confirm the greatest climate risks countywide, whether the identified vulnerable populations and critical assets matched community experiences, and what barriers prevent effective climate adaptation. The County promoted the survey through County communication channels and community outreach networks to reach both suburban and rural communities across unincorporated Lake County and the cities of Clearlake and Lakeport. All responses were voluntary and anonymous to encourage broad participation, taking approximately five to ten minutes to complete. The survey received 151 responses.

The survey results demonstrated strong community validation of the Climate Vulnerability Analysis findings, with over 90 percent of respondents confirming the identified climate risks, vulnerable populations, and critical assets. Respondents strongly agreed that wildfire and smoke pose the greatest climate risks, with 92 percent indicating this ranking matched their lived experiences very well or somewhat well. Respondents overwhelmingly agreed with the identified vulnerable populations, confirming that people of color and immigrant communities, people with high outdoor exposure, households in poverty, Tribal community members, people with chronic illnesses or disabilities, and older adults face the highest climate vulnerabilities. Respondents suggested additional vulnerable groups and critical assets for consideration, including renters, young families, water infrastructure, and healthcare facilities. Similarly, 90 percent of respondents validated the critical assets identified in the vulnerability analysis, including energy and communication infrastructure, homes, transportation systems, agriculture, and recreation as economic drivers, while noting additional priorities such as water infrastructure, healthcare facilities, Clear Lake water quality, and small businesses.

QUESTION 5: What do you see as the biggest barriers preventing the community from effectively preparing for climate change? (Select up to 3)

Answered: 143 Skipped: 8



The survey revealed that funding and financial resources represent the most significant barrier to climate adaptation, identified by 75 percent of respondents. Respondents identified emergency notification systems like Watch Duty (a real-time wildfire tracking and alert platform) and LakeCoAlerts as the most widely utilized preparedness resources. Respondents recognized County government as the primary leader for climate adaptation efforts while emphasizing the importance of collaborative approaches involving State agencies, City governments, community organizations, and Tribal governments. These

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findings provided clear direction for developing Climate Adaptation Plan goals, strategies, and implementation actions that incorporate community priorities.

Interested Parties and Agency Meetings (Fall 2025)

Throughout September 2025, the County convened a series of targeted interested parties and agency meetings to gather sector-specific input on climate adaptation strategies and identify opportunities for collaborative implementation. These meetings brought together representatives from agriculture, businesses, environmental organizations, community-based service providers, and city and county departments to discuss climate vulnerabilities, existing programs and partnerships, barriers to adaptation, and recommendations for building resilience. The meetings were conducted virtually to maximize participation and include representatives from organizations across the county. Participating organizations included the Lake County Community Foundation, Seigler Springs Community Redevelopment Association, Lake County Farm Bureau, University of California Cooperative Extension, Lake County Resource Conservation District, Natural Resources Conservation Service, Shannon Ridge Vineyards, Lake Economic Development Corporation, Lake County Land Trust, Clear Lake Environmental Research Center, American Red Cross Community Adaptation Program, North Coast Opportunities, and Community Health Adaptation and Resilience Mobilization (CHARM) Lake County. City and county departments represented included the Lake County Community Development Department, Lake County Office of Emergency Services, Lake County Department of Public Health, Lake County Public Works, City of Clearlake Community Development and Public Works Departments, and City of Lakeport Community Development and Public Works Departments.

The **Community-Based Organizations Meeting** on September 19, 2025, focused on service delivery to vulnerable populations. Participants emphasized transportation limitations and financial barriers as the most significant challenges facing vulnerable populations during climate hazard events. The meeting highlighted the importance of resilience centers for providing emergency services, the need for improved communication systems in areas with limited cell service, and opportunities for enhanced coordination between community organizations and government agencies.

At the **Agriculture Representatives Meeting** held on September 25, 2025, participants identified financial constraints as the primary barrier to agricultural adaptation. They also highlighted existing resilience programs including the Healthy Soils Program, Environmental Quality Incentives Program, and water efficiency initiatives, while noting coordination challenges with permitting processes and vegetation management along waterways. Agricultural representatives emphasized the need for improved coordination during emergency events through the Agricultural Pass program and stronger partnerships to support farmworker housing and heat safety programs.

The **Business Groups Meeting** held on September 29, 2025, focused on insurances availability and affordability as critical challenges, particularly following recent wildfire events in California. The attendee noted that many business owners lease rather than own their buildings, creating barriers to participating in building hardening and efficiency programs designed for property owners.

At the **Environmental Group Meeting** on September 29, 2025, participants discussed ongoing ecosystem-based adaptation initiatives including the North Coast Integrated Regional Water Management program, forest resilience planning through regional collaborative efforts, and the Lake County Home Hardening Program pilot. Environmental stakeholders emphasized the importance of maintaining updated planning

documents such as the Lake Plan and Community Wildfire Protection Plan to support grant eligibility and implementation efforts.

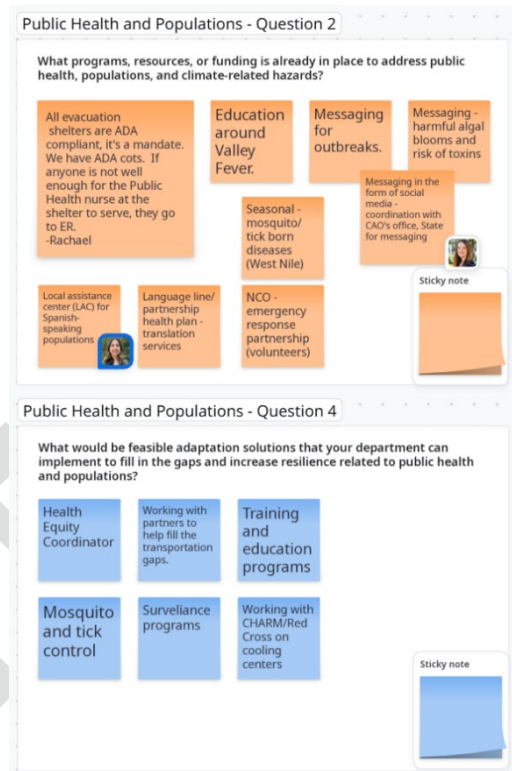
The **City and County Department Staff Meeting** on September 29, 2025, provided an opportunity for County and City staff to review the Administrative Draft Climate Adaptation Plan and discuss implementation considerations. Staff identified existing programs addressing climate hazards, gaps in resources and coordination, and feasible adaptation solutions. The discussion covered topics including infrastructure resilience, emergency preparedness, public health, natural resource management, economic development, housing, and community services. This meeting ensured that proposed strategies and actions align with department capacities and identified opportunities for inter-departmental collaboration in implementation.

Community Risk Reduction Authority Town Hall (September 2025)

On September 25, 2025, the Lake County Community Risk Reduction Authority hosted a Virtual Town Hall from 6:00 p.m. to 7:00 p.m. to present the project and gather public input. The virtual meeting included members of the Lake County Community Risk Reduction Authority representing fire districts, water districts, the Resource Conservation District, the County, the cities of Clearlake and Lakeport, and Tribal governments, as well as community members, environmental organizations, and other stakeholders. The meeting provided an overview of the Climate Vulnerability Analysis findings and proposed adaptation strategies, followed by public comment and guided discussion on successful programs, implementation challenges, and community solutions.

Participants identified several programs and resources that have been most successful in building community resilience, including Watch Duty for emergency wildfire notifications, home hardening programs, FireWise communities and Fire Safe Councils, cultural fire practice education, and the Resource Conservation District's forest management initiatives working directly with landowners. The discussion emphasized the value of hyper-local programs, with nearly two dozen FireWise communities and four Fire Safe Councils engaged throughout the county. Participants identified resources such as the County's emergency preparedness website Lake Co Ready (readylakecounty.ca.gov), North Coast Opportunities' home hardening pilot program, and American Red Cross resilience centers as valuable community assets.

Funding emerged as the primary barrier preventing residents and organizations from implementing climate adaptation measures, identified by multiple participants. Additional challenges included communication barriers due to limited technological access and geographic isolation, shortage of local contractors, and local knowledge gaps among newcomers to the county. Participants noted the emotional challenges associated with home hardening and emphasized the need for continuous information sharing to reduce feelings of being overwhelmed by new regulations. Community members proposed solutions including establishing a climate champion to provide peer-to-peer education at public events, creating a lending



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library of innovative fire-resistant building designs, developing disaster preparedness stations with equipment and tools, providing physical assistance for elderly or disabled residents, and incorporating workforce development programs into housing and resilience initiatives. The meeting underscored strong community support for climate adaptation efforts and the importance of combining funding assistance with accessible education and practical support services.



Study Sessions with Advisory Bodies, City Councils, and the Board of Supervisors

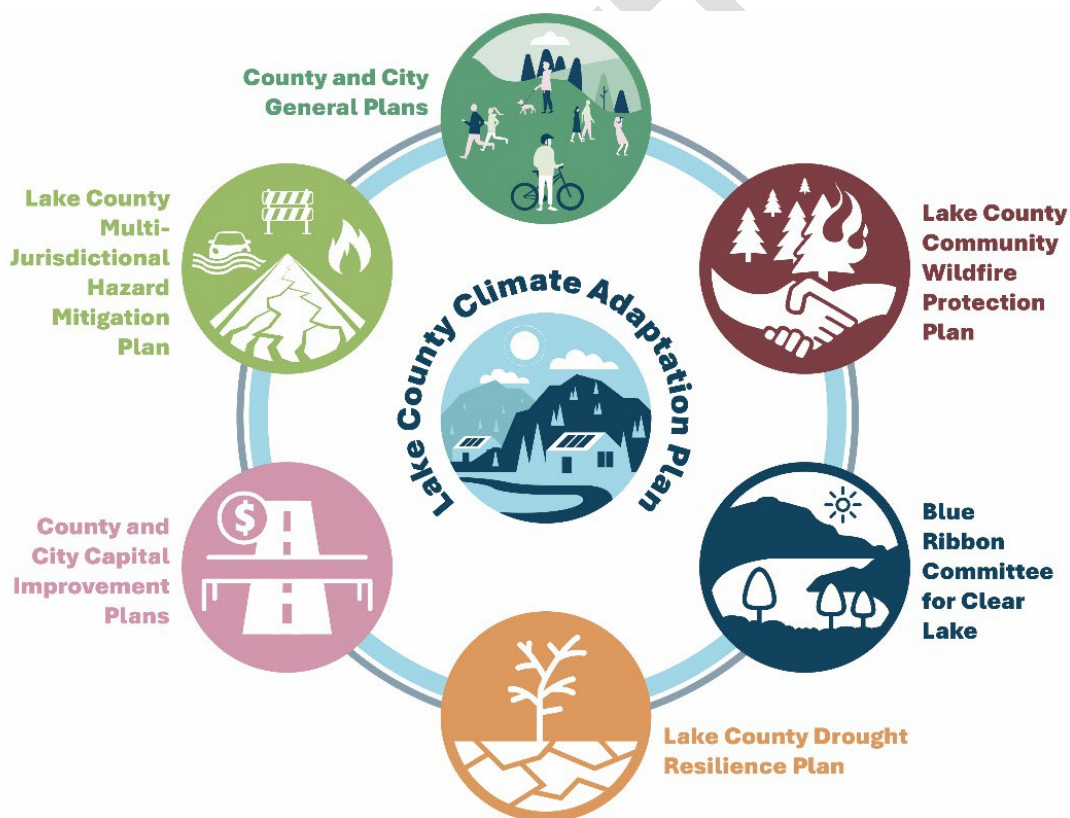
The County project team presented the plan to advisory bodies and elected officials throughout Fall 2025. The team provided updates and facilitated discussions with the Municipal Advisory Committees, General Plan Advisory Committee (October 27, 2025), Local Area Plan Advisory Committee (October 27, 2025), Lake County Planning Commission (October 9, 2025), Lakeport City Council (October 21, 2025), Clearlake City Council (November 6, 2025), and Lake County Board of Supervisors (October 21, 2025). These presentations provided an opportunity to share the Climate Vulnerability Analysis findings, proposed adaptation strategies and actions, and implementation framework with interested parties and decision-makers. During these study sessions, advisory bodies and elected officials were asked “What are your biggest concerns related to implementing climate hazard mitigation, adaptation, or resilience strategies in your community?” Common concerns throughout these meetings included obtaining money and staffing for implementing adaptation actions, how the CAP will integrate with other City and County plans, water quality of Clear Lake, wildfire impacts to workers, and co-management of adaptation strategies with Tribes.

Relationship to Other Plans and Projects

The Planning for an Equitable Climate-Safe Lake project addresses needs identified in multiple existing plans, including the City and County General Plans, Multi-Jurisdictional Hazard Mitigation Plan, and Community Wildfire Protection Plan, as well as Community Mitigation Assistance Team recommendations. This integrated approach ensures the Climate Adaptation Plan builds on and complements existing efforts.

The Climate Adaptation Plan builds on and aligns with existing County, City, and regional plans addressing land use, infrastructure, hazard mitigation, natural resource management, and Tribal-led adaptation efforts. As illustrated in **Figure 3**, the Climate Adaptation Plan complements these related efforts by providing a unifying framework for building long-term community and ecosystem resilience.

Figure 3 Relationship with Other Plans and Efforts



County and City General Plans

In California, a General Plan is a comprehensive, long-term plan that serves as the foundation for all local land use decisions. Required by state law, General Plans establish a community's vision for future development and guide decisions on topics such as land use, transportation, housing, public safety, and resource conservation.

Lake County 2050 is the process to update the County's general plan, a long-range plan to guide growth, resilience, and resource stewardship over the next 25 years. The County's General Plan addresses a wide range of topics such as land use, transportation, housing, health and safety, environmental justice,

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agriculture, and natural resources. Similarly, the City of Clearlake and City of Lakeport maintain their own General Plans that establish long-term visions and policies for development, infrastructure, and community services within their respective jurisdictions.

The Climate Adaptation Plan complements Lake County 2050 and the cities' General Plans by identifying the community's and infrastructure's vulnerabilities to climate change hazards and builds on these existing policy foundations by offering more detailed adaptation strategies. While the General Plans establish broad, long-range goals for land use, infrastructure, housing, and resource management, the Climate Adaptation Plan provides a comprehensive resilience plan that integrates with and strengthens these goals.

Lake County Multi-Jurisdictional Hazard Mitigation Plan

Lake County's Office of Emergency Services (OES), in collaboration with the Cities of Lakeport and Clearlake, prepared the Multi-Jurisdictional Hazard Mitigation Plan in accordance with the federal Disaster Mitigation Act of 2000 and the Federal Emergency Management Agency's hazard mitigation assistance guidance. The Multi-Jurisdictional Hazard Mitigation Plan serves as the County's and Cities' comprehensive strategy to reduce or eliminate long-term risks to life and property from natural hazards through specified actions. The Multi-Jurisdictional Hazard Mitigation Plan examines natural hazards of concern through extensive collaboration between County departments, incorporated cities, tribal governments, fire districts, special districts, and other governmental partners, in addition to significant public input gathered through surveys, public information sessions, and community meetings.

Though the Climate Adaptation Plan and Multi-Jurisdictional Hazard Mitigation Plan address many similar climate-related hazards, the Climate Adaptation Plan focuses on climate-related hazards and how those hazards are expected to change over time as the climate changes. It takes a long-range, comprehensive approach to building community and infrastructure resilience through targeted adaptation strategies. The Multi-Jurisdictional Hazard Mitigation Plan addresses a broader range of natural hazards, prioritizes near-term risk reduction, and is updated every five years to reflect current conditions and mitigation priorities.

Lake County Community Wildfire Protection Plan

The Community Wildfire Protection Plan is a product of the County of Lake, Lake County Fire Chiefs' Association, and Lake County Fire Safe Council, which is administered by the Lake County Resource Conservation District. The Community Wildfire Protection Plan provides fire safety information to residents that can help homeowners reduce the ignitability of their homes. The plan also identifies recommended fuel reduction projects and highlights fire safety resources and organizations across Lake County. While the Community Wildfire Protection Plan focuses specifically on wildfire preparedness, fuel reduction, and community fire safety, the Climate Adaptation Plan provides a broader framework for building resilience to a range of climate change hazards, including extreme heat, drought, flooding, and wildfire. Together, these plans provide a coordinated approach to protecting residents, infrastructure, and ecosystems from wildfire.

Blue Ribbon Committee for the Rehabilitation of Clear Lake

California Assembly Bill 707 established the 15-member Blue Ribbon Committee for the Rehabilitation of Clear Lake, which includes representatives from local Tribal governments; County of Lake; University of California, Davis; California Natural Resources Agency; the Central Valley Regional Water Quality Control Board; public water supplier; and subject matter experts in local economic development, agriculture, and the environment.²⁴ Charged with making recommendations to restore Clear Lake—a resource vital to the region’s economy, ecology, and tribal cultural heritage—the Blue Ribbon Committee brings together diverse expertise to guide recovery efforts. The Blue Ribbon Committee is advancing several key initiatives to rehabilitate Clear Lake, including addressing harmful algal blooms, improved fish passage, shoreline and habitat restoration, monitoring and research, community engagement, and funding and recommendations.²⁵ These efforts aim to improve water quality, restore natural ecosystems, support threatened species, and increase local involvement in lake stewardship. The work of the Blue Ribbon Committee supports the Lake County Climate Adaptation Plan through efforts to enhance biodiversity and ecosystem health and secure long-term funding for the rehabilitation of Clear Lake.

Capital Improvement Plans

The Lake County Capital Improvement Plan is a five-year strategy for the development, maintenance, and preservation of public infrastructure. It outlines individual projects, major studies, equipment purchases, and their associated schedules and funding sources to ensure that infrastructure such as roads, utilities, and public buildings remain in good condition and can meet future growth needs. Both the City of Clearlake and City of Lakeport also maintain their own Capital Improvement Plans that identify priority infrastructure projects and funding strategies specific to their municipal facilities, utilities, and services. These city-level Capital Improvement Plans focus on local infrastructure needs such as municipal streets, parks, water and sewer systems, and public facilities that serve their residents directly.

The Climate Adaptation and Capital Improvement Plans are interconnected because the Climate Adaptation Plan identifies climate risks and proposes strategies to improve infrastructure resilience, which can then be incorporated into the Capital Improvement Plans. This ensures that future infrastructure projects at both county and municipal levels account for these risks and strengthen the capacity to withstand future hazard events.

Lake County Drought Resilience Plan

Lake County is home to over 80 small water providers, many of which are State small water systems or domestic wells. The Lake County Drought Resilience Plan will support the County in facilitating the preparedness of these systems for drought and water shortage. It outlines available data and tools, short-term response actions, long-term mitigation strategy and actions, and other drought-supporting capacities for State small water systems and domestic wells. By reducing drought risks; maintaining water systems during shortages; and protecting the streams, wetlands, and watersheds that provide clean water, the Drought Resilience Plan advances the broader goals of the Climate Adaptation Plan.

Tribal-Led Adaptation Projects

Several climate adaptation initiatives throughout Lake County, led or co-led by Tribes, are addressing environmental and infrastructure challenges and regional forest health through targeted, grant-funded efforts.

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- The Community Health Adaptation and Resilience Mobilization (CHARM) project, led in part by the Big Valley Band of Pomo Indians, is developing a coordinated response plan for extreme heat and harmful algal blooms affecting Clear Lake.²⁶
- The State of California's Tribal Climate and Clean Energy Planning Grant Program has awarded funding to Lake County Tribes to build energy and environmental resilience.
 - The Big Valley Band of Pomo Indians received \$250,000 to study a renewable microgrid system.
 - The Middletown Rancheria secured \$215,000 for an energy audit and conservation plan.
 - The Scotts Valley Band of Pomo Indians was given \$248,000 to explore development of a bioenergy plant.²⁷
- The Lake County Community Risk Reduction Authority, with tribal participation from Habematolel, Middletown, Robinson, and Scotts Valley, received \$175,000 for a biomass supply and utilization study.²⁸
- A \$191,000 Caltrans grant is funding a study to identify infrastructure priorities for tribal lands, advancing climate-resilient mobility across the county.²⁹
- North Coast Opportunities partnered with the Middletown Rancheria of Pomo Indians to secure a \$2.3 million grant through the Extreme Heat and Community Resilience Program to implement SolarCHILL, which will create climate-resilient homes for vulnerable residents, provide workforce development and green jobs, and conduct community engagement with leadership from Tribes.³⁰



CLIMATE CHANGE IN LAKE COUNTY

Climate Change Hazards

Climate change is the long-term shift in average weather patterns, including significant changes in temperature and precipitation patterns over an extended period, typically decades or longer. At a local level, these shifts in temperatures and rainfall patterns cause more frequent extreme heat days, increase the severity of droughts, increase the intensity of rainfall events, and increase the severity of wildfires. Climate-stressors or trends related to climate change can exacerbate natural hazards.³¹ Primary climate stressors result in secondary climate stressors or hazards, that is, events or physical conditions with the potential to cause harm.³² This section describes the primary and secondary climate stressors in unincorporated Lake County and the cities of Clearlake and Lakeport, and how these stressors are expected to change in the coming years and decades.

In unincorporated Lake County, Clearlake, and Lakeport, the two primary climate stressors are increases in air temperature and changes in precipitation patterns. These stressors are direct effects of a rise in global temperatures due to increases in greenhouse gas emission levels in the atmosphere. Secondary climate stressors, that is, hazards that result from changing temperatures and precipitation patterns include agriculture and forestry pests and diseases, drought, extreme temperatures, flooding, human health hazards, landslides and debris flow, severe weather, and wildfire and smoke.

Primary Climate Stressors



Change in Temperature

Projected changes in air temperatures in Lake County show a substantial increase from historical levels as global temperatures continue to rise. As shown in **Table 1**, projections show a steady increase in annual average minimum temperatures across the county.³³ As shown in **Table 2**, projections show a similar upward trend in the countywide maximum temperature.³⁴ Note that these projections are averages and do not illustrate extreme

heat days.

Table 1 Historical and Projected Annual Average Minimum Temperature

Locations	Observed (1961–1990)	Near Term (2025–2035)	Midcentury (2035–2064)	Late Century (2070–2099)
Countywide	37.9	40.9	42.3	45.9
Clearlake	40.5	43.4	44.8	48.5
Lakeport	41.2	44.0	45.5	49.1

Source: Cal-Adapt. 2024. Annual Averages. <https://cal-adapt.org/tools/annual-averages/>.

Note: Projections are an average of the four State-recommended climate models (HadGEM2-ES, CNRM-CM5, CanESM2, MIROC5), averaged for near term (2025–2035), midcentury (2035–2064), and late century (2070–2099).

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Table 2 Historical and Projected Annual Average Maximum Temperature

Locations	Observed (1961–1990)	Near Term (2025–2035)	Midcentury (2035–2064)	Late Century (2070–2099)
Countywide	67.7	70.8	72.4	75.8
Clearlake	71.0	74.1	75.7	79.1
Lakeport	71.5	74.5	76.0	79.4

Source: Cal-Adapt. 2024. Annual Averages. <https://cal-adapt.org/tools/annual-averages/>.

Note: Projections are an average of the four State-recommended climate models (HadGEM2-ES, CNRM-CM5, CanESM2, MIROC5), averaged for near term (2025–2035), midcentury (2035–2064), and late-century (2070–2099).

As shown in **Figure 4**, average annual maximum temperatures in most of the county are likely to reach 70 degrees, with the highest temperatures exceeding 75 degrees in the Lakeport, Kelseyville, Middletown, Lower Lake, and East Lake Communities Areas.³⁵ As shown in **Figure 5**, average annual maximum temperatures in most of the county are likely to reach 75 degrees, with the highest temperatures exceeding 80 degrees in the Lakeport, Kelseyville, Middletown, Lower Lake, and East Lake Communities Areas. Rising temperatures will worsen hazards such as extreme heat, agricultural pests and diseases, human health risks, and wildfire.³⁶



Changes in Precipitation Patterns

Countywide historic annual average precipitation from 1961 to 1990 was approximately 42 inches per year.³⁷ As shown in **Table 3**, average annual rainfall is expected to increase slightly through the 21st century, but the timing and intensity of precipitation will likely shift. **Figure 6** and **Figure 7** show the projected precipitation levels for midcentury and

late century, respectively. Areas around Clear Lake may see the largest increases in annual averages, particularly in the northern and southern portions of the county, where totals could exceed 45 inches per year.³⁸ These changes in precipitation patterns will contribute to or worsen hazards such as drought, flooding, landslides, severe weather, and wildfire across both unincorporated and incorporated areas.

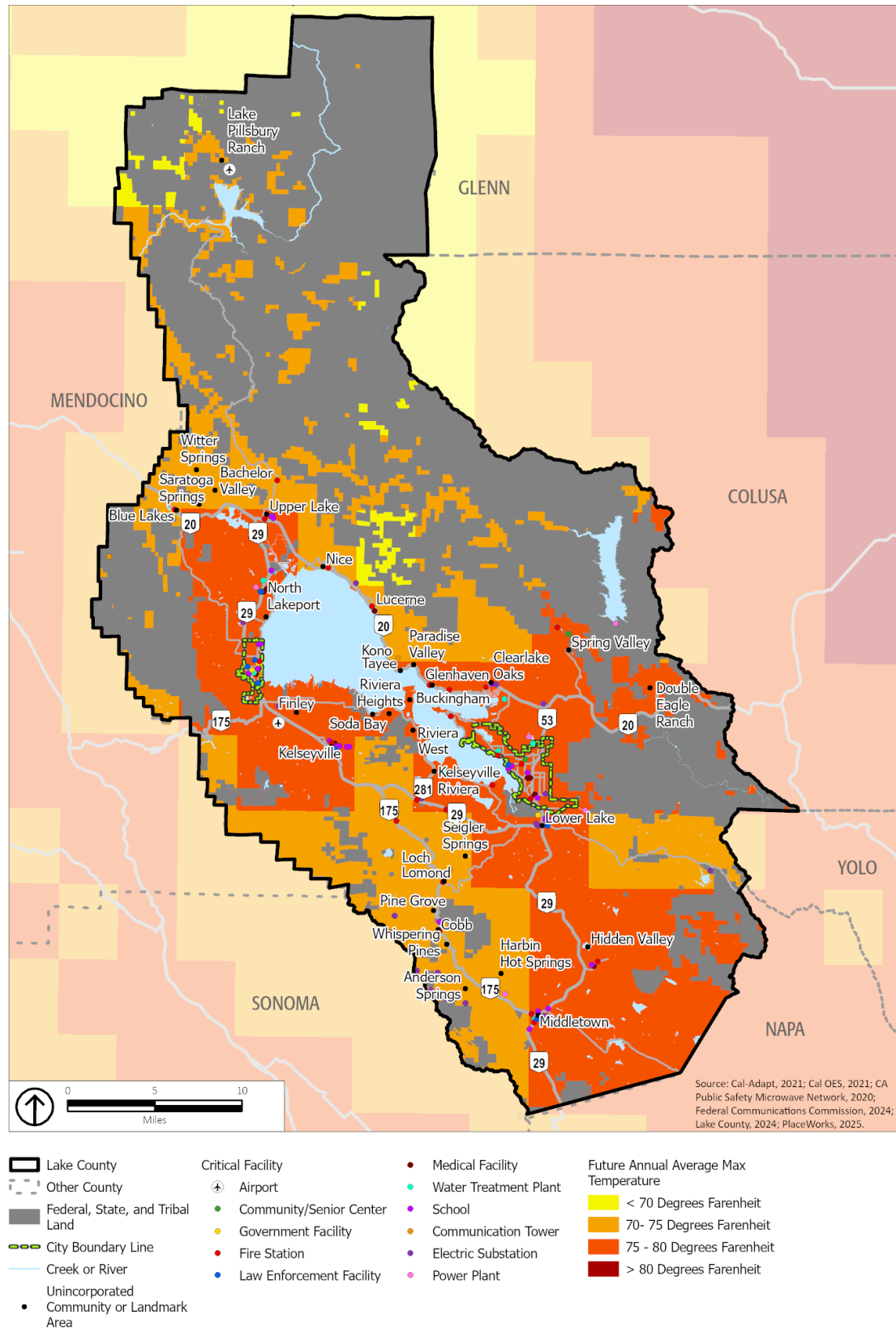
Table 3 Historical and Projected Annual Average Precipitation (inches per year)

Locations	Observed (1961–1990)	Near Term (2025–2035)	Midcentury (2035–2064)	Late Century (2070–2099)
Countywide	41.9	47.5	46.8	51.3
Clearlake	33.2	38.3	37.9	41.9
Lakeport	30.7	34.8	34.1	37.3

Source: Cal-Adapt. 2024. Annual Averages. <https://cal-adapt.org/tools/annual-averages/>.

Note: Projections are an average of the four State-recommended climate models (HadGEM2-ES, CNRM-CM5, CanESM2, MIROC5), averaged for near term (2025–2035), midcentury (2035–2064), and late century (2070–2099).

Figure 4 **Projected Annual Average High Temperatures (Midcentury)**



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Figure 5 **Projected Annual Average High Temperatures (Late Century)**

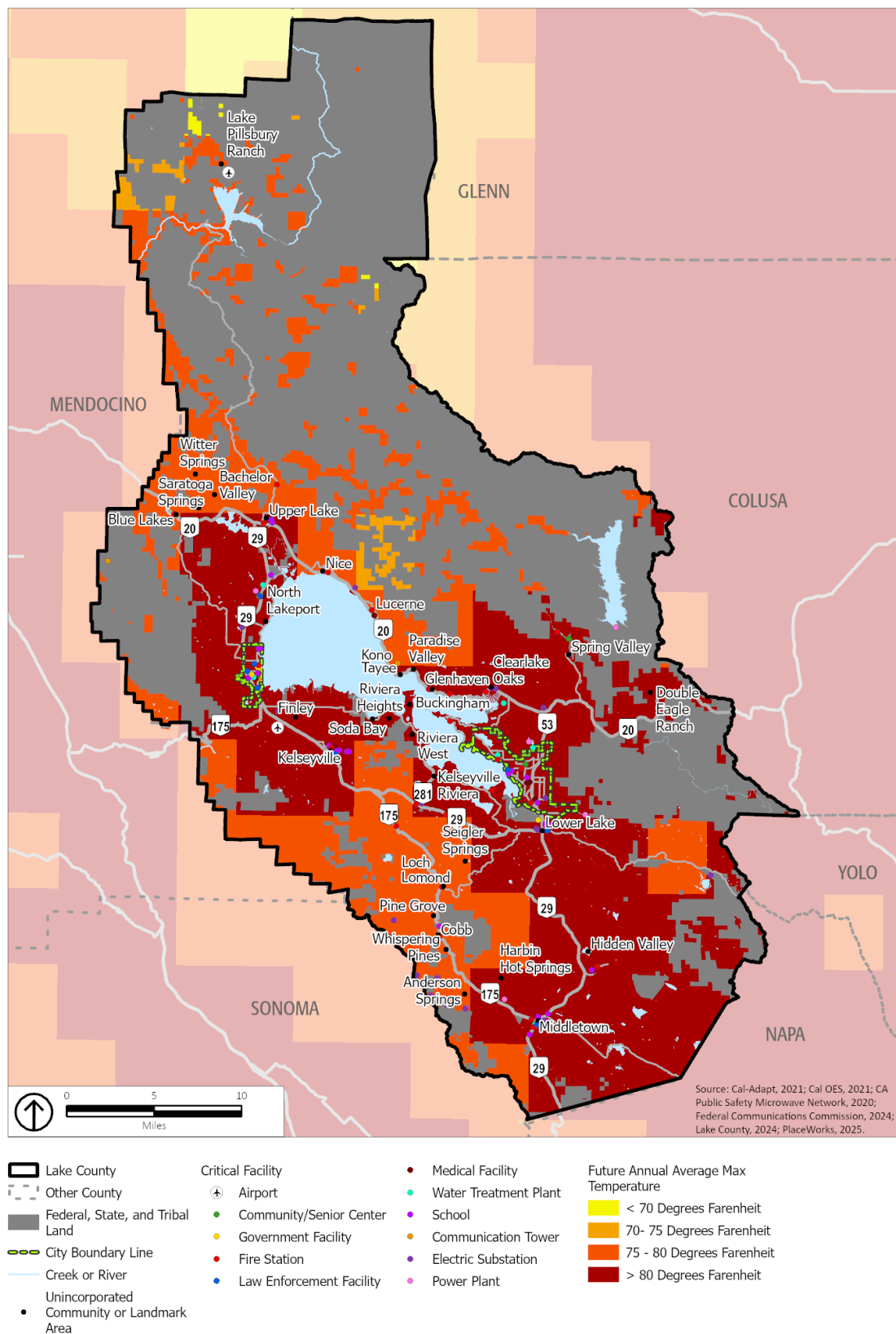
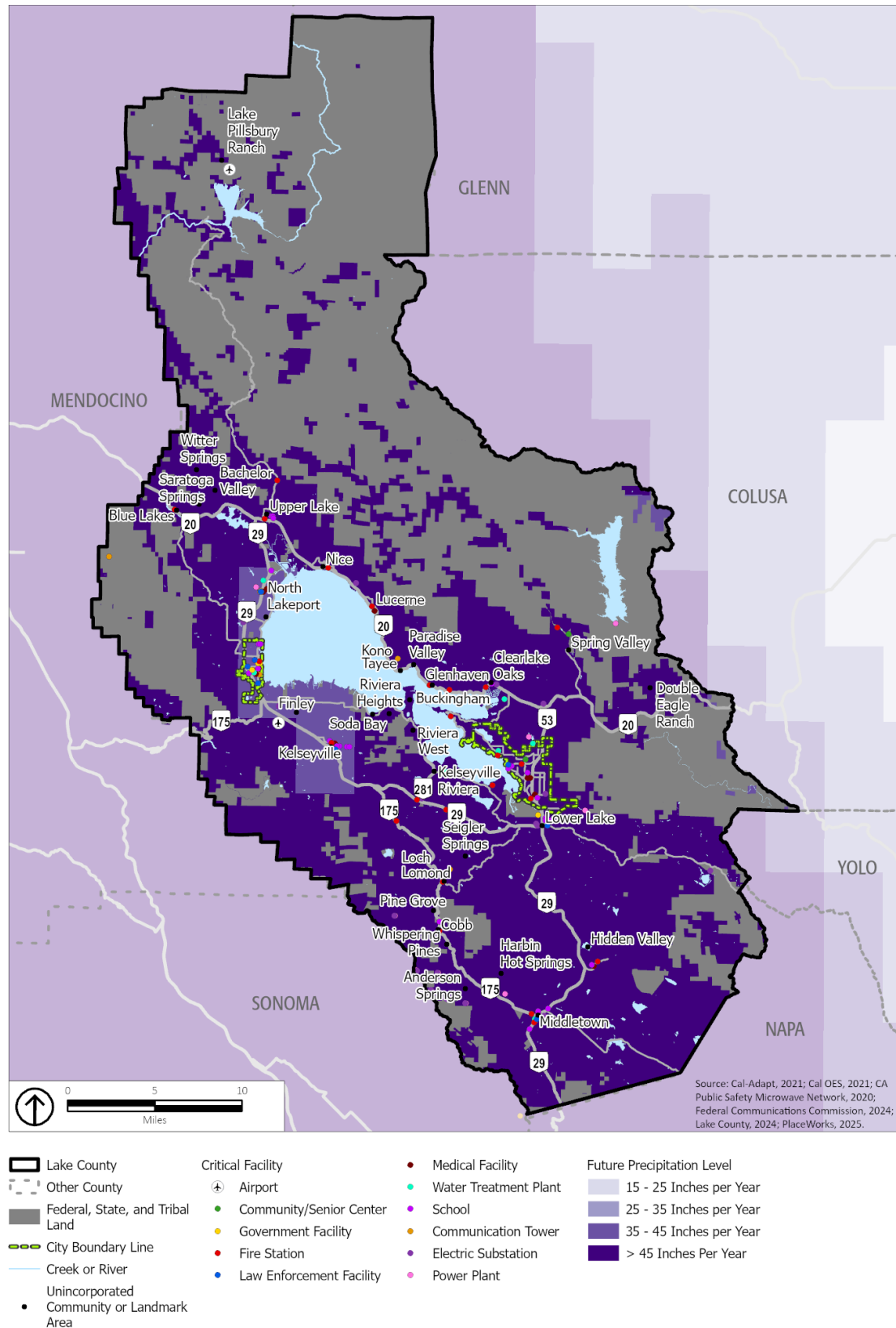
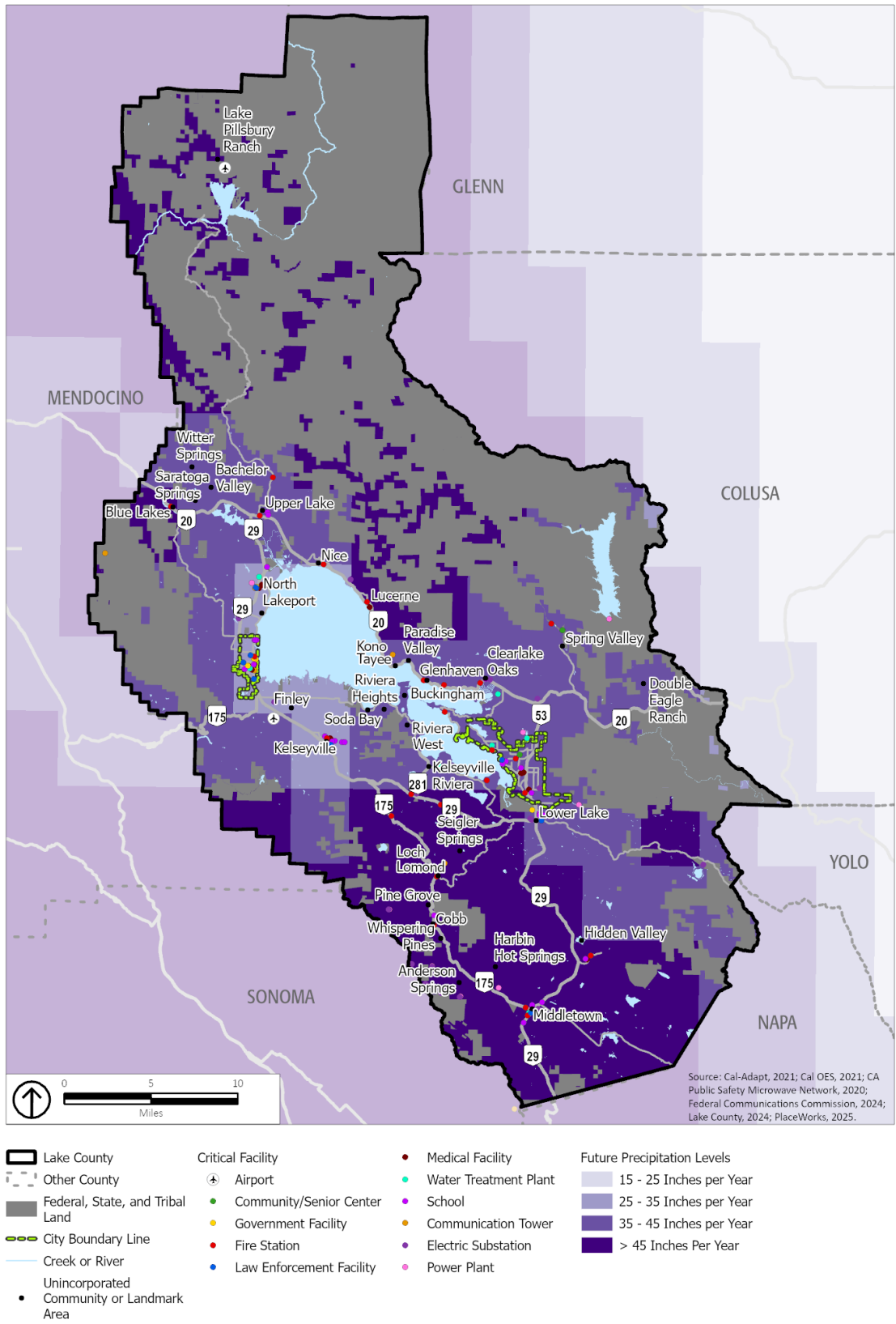


Figure 6 Projected Precipitation Levels (Midcentury)



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Figure 7 Projected Precipitation Levels (Late Century)



Secondary Climate Stressors



Agriculture and Forestry Pests and Diseases

Agricultural and forestry pests and diseases are plant and animal species that can harm Lake County's natural environment and agricultural areas. Invasive plant species threaten local ecosystems and harm agriculture. Forestry pests and diseases, such as bark beetles, Mediterranean oak borer, and Sudden Oak Death, can severely damage tree populations, leading to large-scale forest die-offs, which in turn affect wildlife habitat, carbon sequestration, and water availability. Climate change is expected to increase the abundance and range of both native and non-native pests, as well as weaken crops, forests, and livestock, leaving them more susceptible to harm from pests and diseases. Warmer temperatures and disrupted ecosystems create ideal conditions for harmful algal blooms and declining forest and water health, harming residents and economic drivers throughout the county. CHARM Lake County's 2024 community assessment documented widespread impacts of harmful algal blooms on residents' health and quality of life, including respiratory and skin problems, odors that affect air quality, disruption of recreational activities, and uncertainty about how to receive harmful algal bloom notifications.



Drought

A drought is when conditions are drier than normal for an extended period, making less water available for people and ecosystems. Though droughts are normal in California, prolonged drought conditions can harm ecosystems, people, and the economy. Drought can lead to critical environmental and economic harm, including crop loss, increased water costs, habitat degradation, and heightened wildfire risks. Lake County, Lakeport, and Clearlake primarily rely on local surface water and groundwater sources; approximately 60 percent of residents countywide depend on Clear Lake as their source of drinking water.³⁹ Agricultural operations primarily rely on groundwater supplies, which are vital for sustaining local farming operations. Drought reduces groundwater recharge and decreases stream flows from increased pumping, leading to lower groundwater levels and less water for agriculture, households, and wildlife. Though overall precipitation levels are expected to increase across the county,⁴⁰ climate change will also cause more frequent and intense droughts. Drier conditions harden soil, limiting water absorption when rain returns, increasing the risk of flooding. Higher temperatures also accelerate evaporation, increasing water needs of plants and water systems during droughts.



Extreme Temperatures

Extreme temperatures include extreme heat, extreme cold, and warm nights. Extreme heat days are defined as temperatures exceeding 98 percent of historical highs.⁴¹ Extended periods of extreme heat, known as heat events or waves, threaten community safety, drive up energy costs, and exacerbate the risks of wildfires and water shortages. On an extreme heat day in Lake County, temperatures reach at least 97.1 degrees countywide, 101.9 degrees in Clearlake, and 103.1 degrees in Lakeport.⁴² Warm nights, when minimum temperatures remain above normal levels during nighttime hours, can worsen extreme heat events by limiting relief for people and community assets. On a warm night, temperatures remain above at least 55.6 degrees countywide, 59.5 degrees in Clearlake, and 60.5 degrees in Lakeport. As shown in **Table 4** and **Table 5**, climate change is expected to increase extreme heat days and warm nights in the county, Clearlake, and Lakeport.

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The warmer temperatures brought on by climate change will cause an increase in the number of extreme heat and warm night events throughout the county, posing health risks to residents and visitors, especially to residents without access to cooling. Extreme heat can damage transportation systems and harm ecosystems by raising water temperatures, affecting fish and plant species. On an extreme cold day, temperatures fall below and do not exceed 37.9 degrees countywide, 40.5 degrees in Clearlake, and 41.2 degrees in Lakeport.⁴³ Extreme cold, though less common due to climate change, can disrupt energy systems by reducing power transmission efficiency and causing outages.

CHARM Lake County's 2024 community assessment revealed the severe impacts of extreme heat on residents, with 23 percent (of the 231 total respondents) expressing doubt about their ability to stay cool during heat waves and 21 percent reporting having air conditioning they cannot afford to operate. Additionally, 41 percent of households lack backup power sources, creating life-threatening conditions during heat events combined with power shutoffs.

Table 4 Projected Number of Annual Extreme Heat Days

Locations	Observed (1961–1990)	Near Term (2025–2035)	Midcentury (2035–2064)	Late Century (2070–2099)
Countywide	4	12	20	42
Clearlake	3	10	16	35
Lakeport	3	10	16	34

Source: Cal-Adapt. 2024. Extreme Heat Days and Warm Nights. <https://cal-adapt.org/tools/extreme-heat/>.
Note: Projections are an average of the four State-recommended climate models (HadGEM2-ES, CNRM-CM5, CanESM2, MIROC5), averaged for near term (2025–2035), midcentury (2035–2064), and late century (2070–2099).

Table 5 Projected Number of Annual Warm Nights

Locations	Observed (1961–1990)	Near Term (2025–2035)	Midcentury (2035–2064)	Late Century (2070–2099)
Countywide	5	19	32	77
Clearlake	5	16	26	65
Lakeport	4	14	23	60

Source: Cal-Adapt. 2024. Extreme Heat Days and Warm Nights. <https://cal-adapt.org/tools/extreme-heat/>.
Note: Projections are an average of the four State-recommended climate models (HadGEM2-ES, CNRM-CM5, CanESM2, MIROC5), averaged for near term (2025–2035), midcentury (2035–2064), and late century (2070–2099).



Flooding

Flooding takes place when stormwater covers normally dry land with water, which can result from creeks and streams overtopping their banks, heavy rainfall surpassing the capacity of drains, dam failure, or water and wastewater infrastructure failure. Flooding happens throughout the county during the rainy season from November through April.⁴⁴

Flooding can not only cause immediate property damage but also long-term public health issues due to mold and mildew growth, community displacement, and increased economic burdens.

Among the water bodies in the county, tributaries to Clear Lake—Scotts Creek near Lakeport, Cole Creek and Kelsey Creek south of Kelseyville, and Adobe Creek west of Kelseyville—experience the most significant flooding issues. In South County, Putah Creek poses significant flooding risks, particularly in the Hidden Valley Lake area where levee infrastructure needs to be maintained to withstand atmospheric rivers and extreme precipitation events. These creeks also contribute significantly to high water levels in the lake and lakeshore flooding. As shown on **Figure 8**, flood-prone areas across the county include areas around the shoreline of Clear Lake; the unincorporated communities of Upper Lake, North Lakeport, Finley, Kelseyville, Clearlake Oaks, and Lower Lake; and the cities of Clearlake and Lakeport.

Climate change is expected to make flood events worse due to fewer yet more intense precipitation events in the form of atmospheric rivers.⁴⁵ For example, what is currently a 200-year storm, or one that has a 1 in 200 chance of occurring each year, by 2100 could increase in frequency by 40 to 50 years (to a 1 in 150/160 chance each year).⁴⁶ This means that the 100- and 500-year floodplains may expand, and the current floodplains may become 40- to 50-year floodplains.



Human Health Hazards

Human health hazards such as bacteria, viruses, parasites and disease-carrying vectors like mosquitoes, ticks, rats, and mice pose serious risks in Lake County. Rising temperatures and changing precipitation patterns due to climate change promote the proliferation of disease-carrying vectors such as rats, mice, ticks, and mosquitos. As temperatures rise and extreme weather events become more frequent, these vectors can

spread more broadly, transmitting diseases that threaten public health.⁴⁷ The implications of these health hazards extend beyond individual well-being, placing strain on healthcare systems, increasing economic burdens, and affecting mental health.



Landslides and Debris Flows

Landslides commonly occur during or after intense rainfall, particularly in areas previously affected by wildfires where vegetation loss has destabilized slopes. The mountainous terrain of the unincorporated county and the city of Clearlake consists of high-relief landscapes prone to landslides. Climate change will exacerbate landslide

hazards by increasing frequency of wildfires and severe storms. Wildfires remove stabilizing vegetation and alter soil properties, making slopes more vulnerable to erosion during heavy rainfall. Areas throughout the unincorporated county that have historically experienced landslides include Clearlake Oaks, Lucerne, Kelseyville, Riviera, Cobb Mountain, Cache Creek, and Bartlett Springs.⁴⁸ As shown on **Figure 9**, a majority of the county is at high risk of landslides, especially in the hillsides. However, landslide risk is generally low to moderate near the shoreline of Clear Lake.

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Figure 8 Flood Hazard Zones

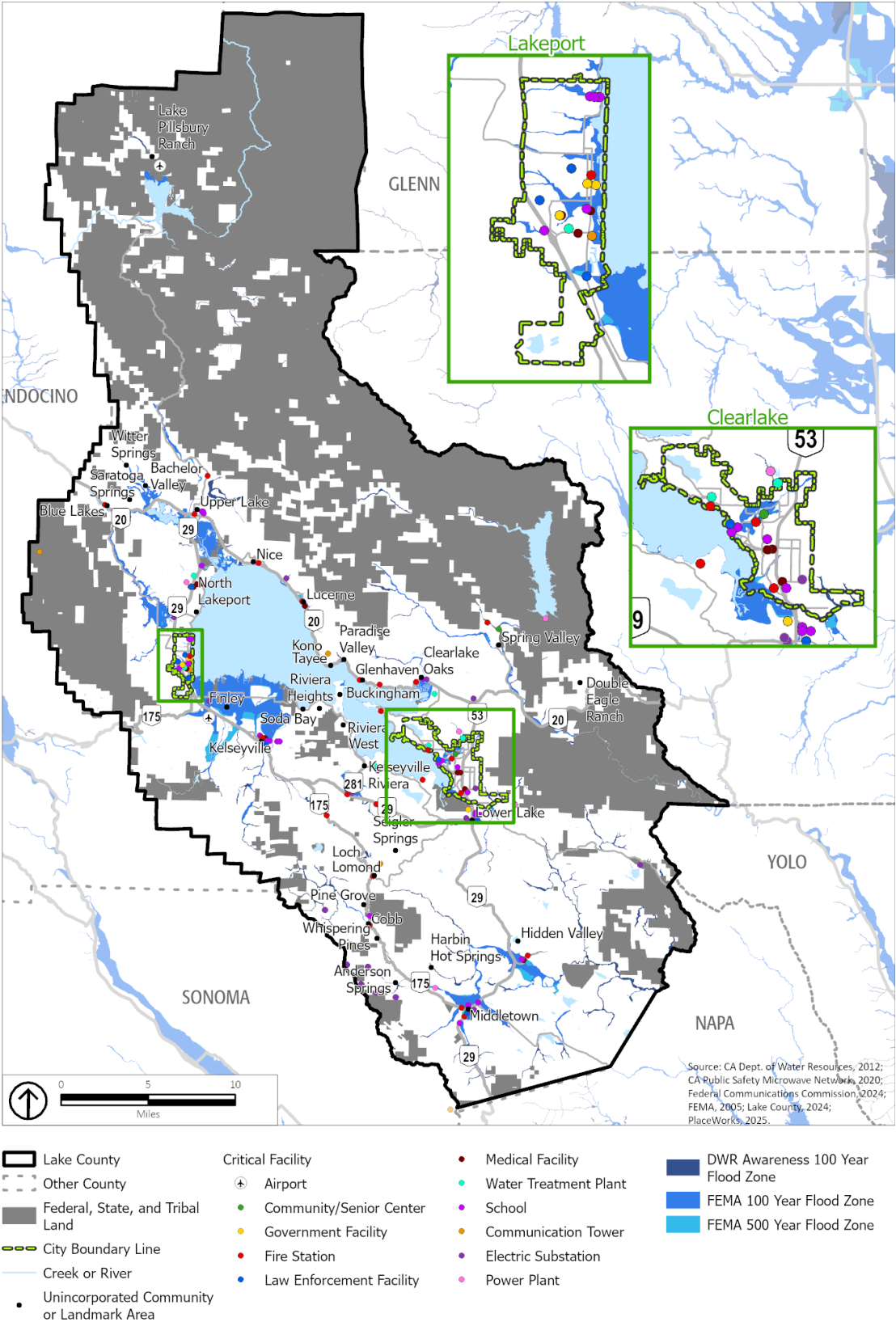
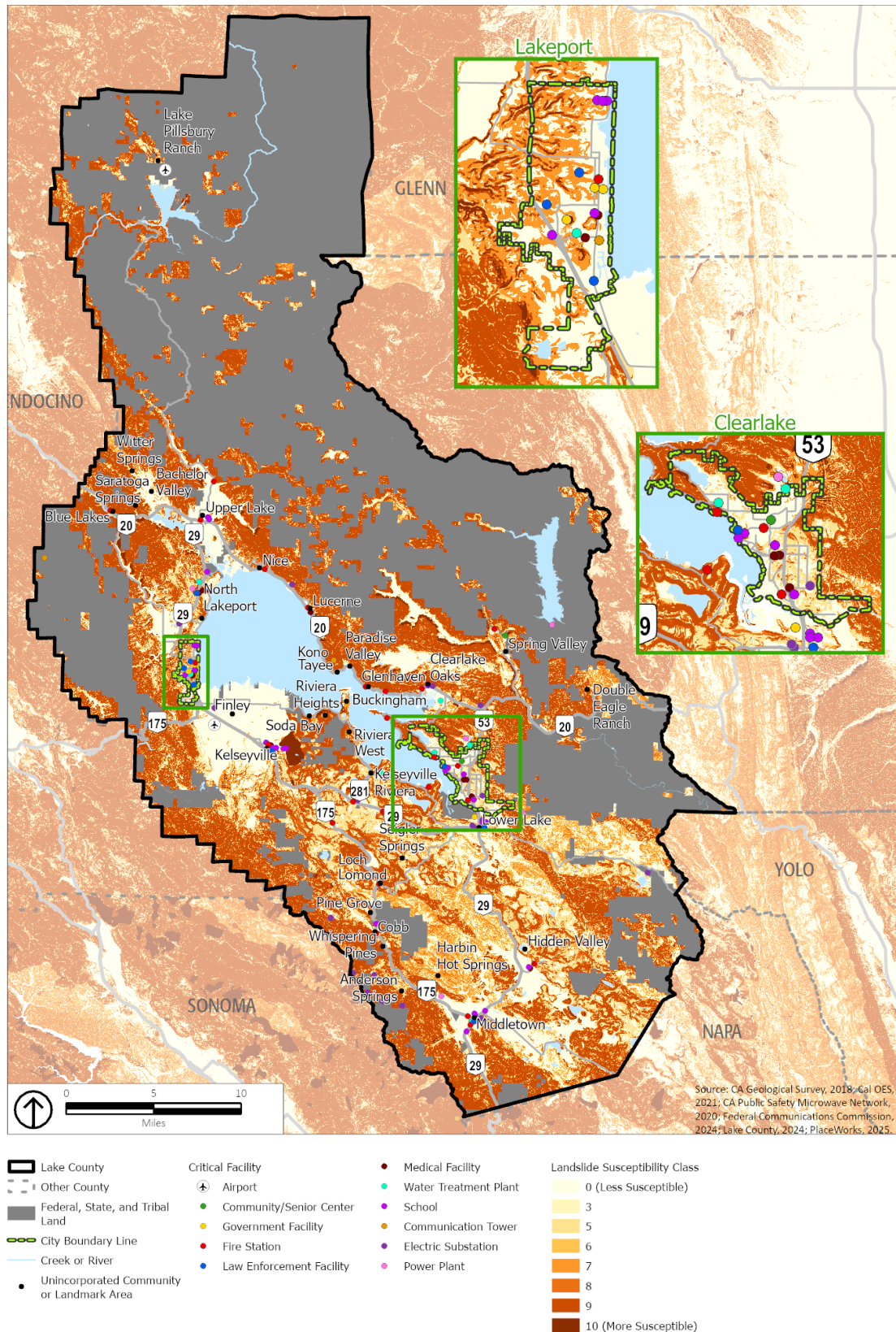


Figure 9 **Landslide Susceptibility**



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Severe Weather

Severe weather poses a significant threat across Lake County, disrupting daily life, compromising safety, and affecting infrastructure and ecosystems. The most common severe weather events that have historically impacted Lake County are heavy rains (usually a result of atmospheric rivers), thunderstorms, and windstorms. Severe weather may cause physical injuries, structural damage, blocked roads, and wildfires. Increased average annual rainfall due to climate change throughout the county will also cause an increase in the number of years with intense precipitation events, increasing the severity of flooding and other hazards.⁴⁹

Public safety power shutoffs are a preventive strategy to reduce wildfire risk during severe wind events. However, this may disrupt communication networks, making it harder for residents to receive emergency notifications and for first responders to coordinate effectively. The limited redundancy of communication and energy infrastructure due to the remoteness of the county exacerbates risks for people who depend on medical devices and those who need electricity for heating and cooling.



Wildfire and Smoke

The county's Mediterranean climate, steep topography, and diverse plant communities create ideal conditions for wildfire. Historically, the fire season extended from early summer through late fall of each year during the hotter, drier months, but it is growing to year-round due to higher temperatures, lower moisture content in air and plant matter, accumulation of vegetation, and high winds. Wildfire smoke from local and regional wildfires degrades local air quality, posing significant threats to public health, agriculture operations, and outdoor recreation.

Wildland Urban Interface (WUI) Definition

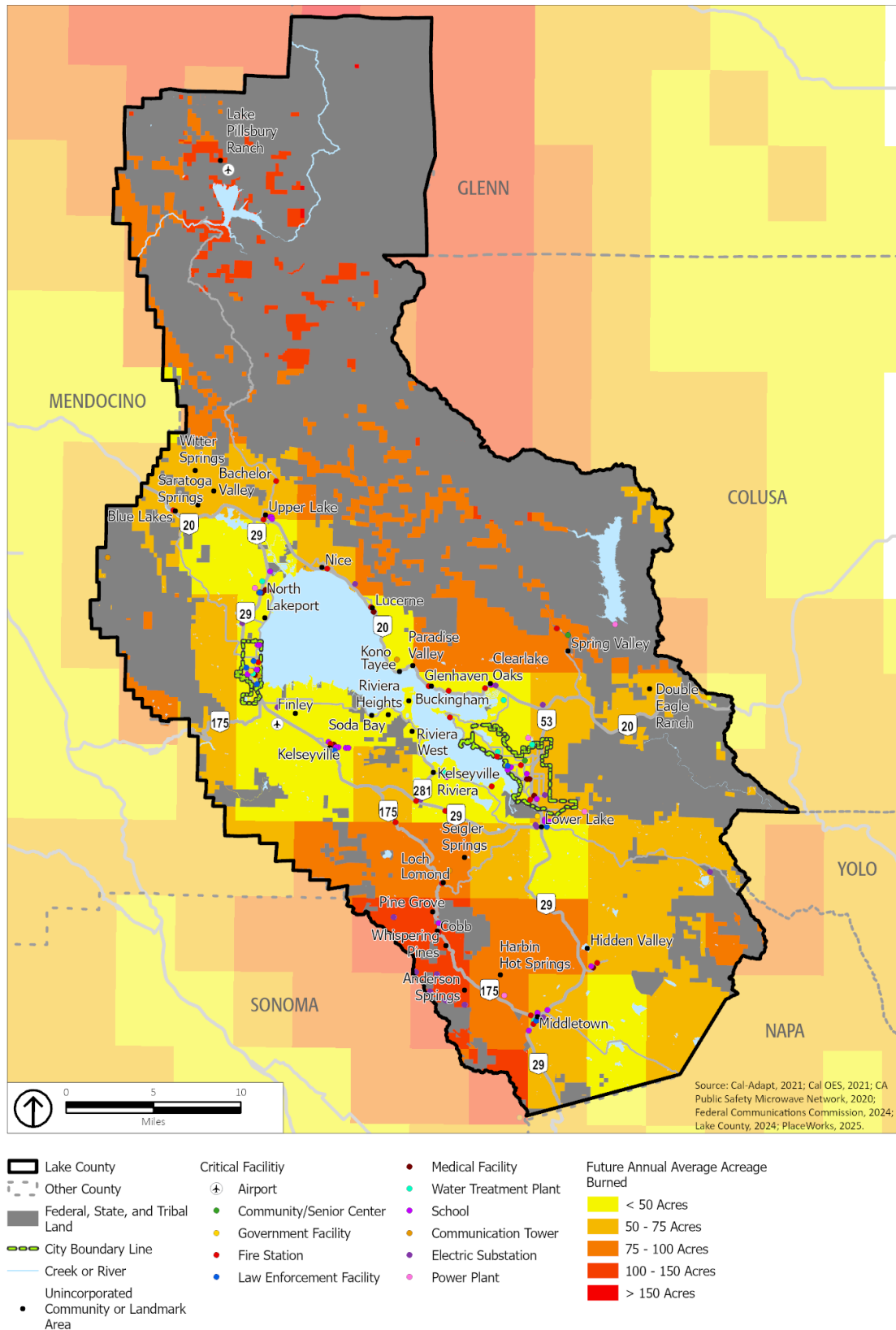
The WUI is the zone of transition between unoccupied land and human development. It is the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

Source: U.S. Fire Administration 2022.

The communities most at risk of wildfire are those located in the wildland urban interface surrounded by extensive open spaces and forested lands, especially along hillsides, which heightens their vulnerability to wildfires. The communities of Nice, Lucerne, Glenhaven, Soda Bay, the Rivas, Cobb, and Lake Pillsbury; the northern, eastern, and southern portion of Clearlake; and the western boundary of Lakeport are in Very High Fire Hazard Severity Zones.⁵⁰

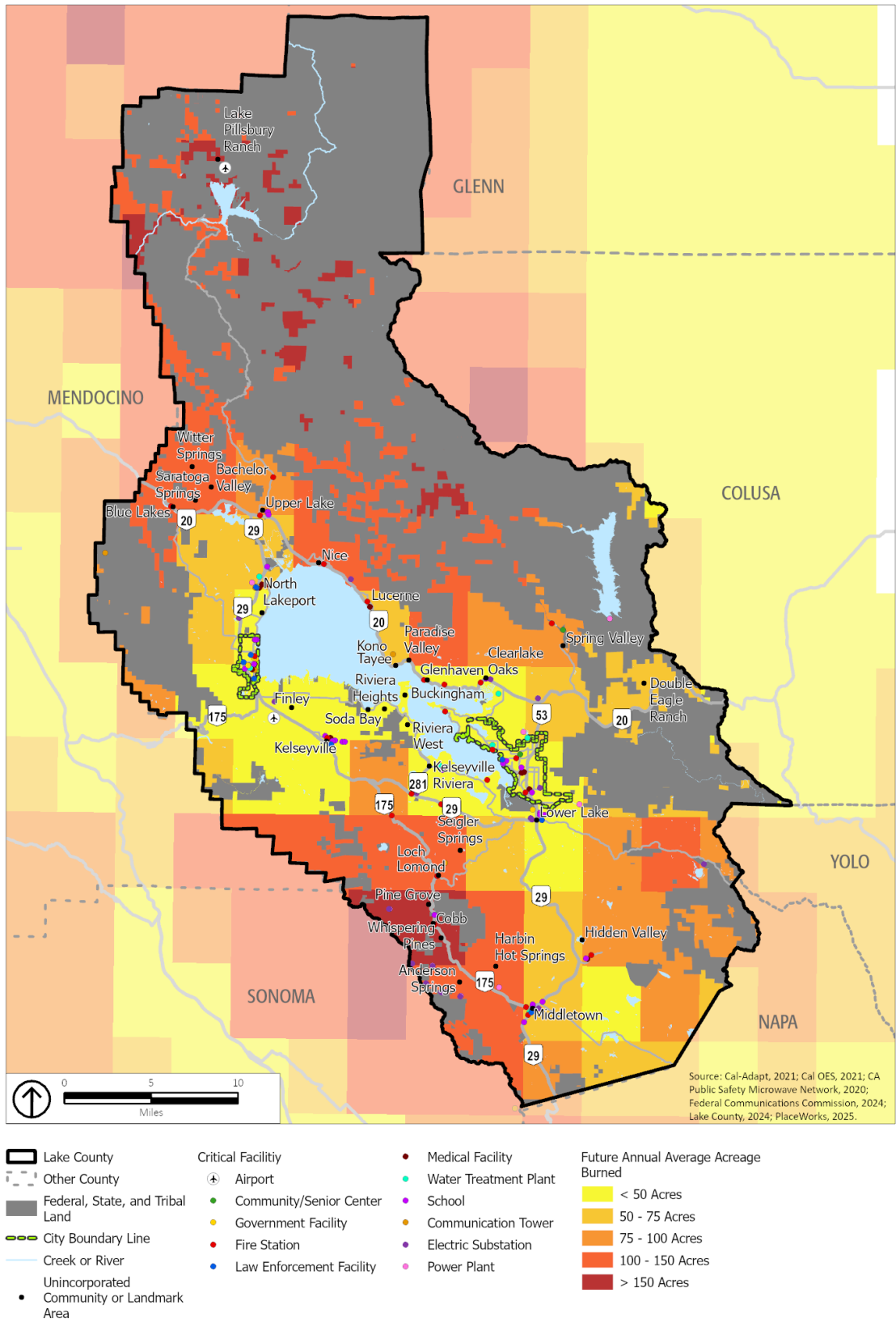
A combination of factors, including weather, topography, and vegetation, create a higher risk of wildfire hazards now and in the future. Though large-scale wildfires do not occur every year, wildfire incidents driven by extreme weather conditions are more likely due to climate change. Historically, an annual average of 7,849 acres burned in Lake County; however, this is projected to increase to 10,632 acres by midcentury and to 11,912 acres by late century.⁵¹ Some years may have few or no wildfires, but other years will have many more or larger fires. The increase in annual average acres burned will also lead to more days with severe smoke and poor air quality conditions. **Figure 10** and **Figure 11** show the future annual average acres burned in Lake County for midcentury and late century, respectively.

Figure 10 Future Annual Average Acres Burned (Midcentury)



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Figure 11 Future Annual Average Acres Burned (Late Century)



Climate Vulnerability Assessment: Key Findings

The key findings of the Climate Vulnerability Analysis identify the people and community features most vulnerable to climate-related hazards. A population or community asset identified in the key findings reflects severe climate change impacts and lack of adaptive capacity. The analysis also considered other factors, such as the size of the population, the role that an asset plays in maintaining community-wide well-being, and the potential for compounding or cascading effects.

Wildfire and smoke are responsible for the greatest number of high vulnerabilities countywide, followed by severe weather, flooding, and drought. The following paragraphs give additional detail about the most vulnerable populations and community assets countywide.

People of Color and Immigrant Communities: These communities face disproportionate impacts from all climate hazards due to historical marginalization, language barriers, and economic constraints.⁵² Many work in outdoor occupations directly exposed to extreme heat, wildfire smoke, and agricultural pests. They often live in areas with limited infrastructure and may distrust or lack awareness of government services, making it difficult to access critical resources during emergencies. Approximately 9.4 percent of the county's population is foreign born, and approximately 23.6 percent speak English less than "very well".⁵³

People with High Outdoor Exposure: Agricultural, forestry, landscaping, and construction workers face increased health risks from direct exposure to extreme heat, vector-borne diseases, and wildfire smoke due to outdoor occupations. Those experiencing homelessness (approximately 290 individuals countywide) lack adequate shelter from hazards and have limited access to water, sanitation, and healthcare. Approximately 84.3 percent of the county's population work outdoors.⁵⁴

Households in Poverty: Approximately 17 percent of unincorporated county residents, 11 percent of Lakeport residents, and 25 percent of Clearlake residents live in poverty.⁵⁵ These households typically lack resources to invest in home repairs, weatherization improvements, and disaster preparedness. They often have inadequate insurance coverage, making recovery from disasters particularly challenging. Rising utility costs during drought or extreme heat disproportionately impact their limited budgets.

Persons in Tribal Communities: Tribal communities face significant disruptions to cultural practices and resources from climate hazards. Drought and extreme heat threaten traditional food sources, and wildfires damage culturally significant sites. Poor water quality in Clear Lake, a vital cultural and subsistence resource, disproportionately impacts tribal members, and housing insecurity among tribal members limits adaptive capacity.

Persons with Chronic Illnesses and/or Disabilities: Approximately 21 percent of residents in both unincorporated Lake County and Clearlake, and 17 percent in Lakeport, report living with at least one type of disability.⁵⁶ These individuals face heightened risks during emergencies due to mobility challenges, medical dependencies, and evacuation difficulties. Extreme heat, poor air quality, and vector-borne diseases can worsen existing health conditions.

Energy and Communication Infrastructure and Services: These systems are highly vulnerable to flooding, landslides, severe weather, and wildfire, particularly in remote areas with limited redundancy. Damage to power lines or communication towers can disrupt essential services and economic drivers for

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extended periods. Power outages during extreme heat or winter storms create cascading impacts on other critical systems and vulnerable populations.

Homes: Residential structures throughout the county and cities of Clearlake and Lakeport face multiple hazards, including wildfires, flooding, landslides, and severe weather. Even minor initial damage can lead to mold, mildew, and foundation failures that make homes uninhabitable. Extreme heat and wildfire smoke create dangerous indoor temperature and air quality conditions, particularly for residents without adequate cooling systems or air filtration. The condition and quality of housing stock is a significant vulnerability factor, as substandard housing is less resilient to climate hazards. A substantial portion of Lake County's housing stock suffers from deferred maintenance, inadequate structural integrity, and outdated building systems that increase vulnerability to climate impacts.⁵⁷

Many residential parcels in Lake County, including those in Clearlake and Lakeport, are in hazard-prone areas. Over 37,000 homes lie within zones of elevated wildfire risk, including approximately 31,484 parcels valued at roughly \$3.3 billion in the State Responsibility Area, and another 5,948 parcels valued at around \$1.12 billion in the Local Responsibility Area.⁵⁸ Additionally, nearly 730 improved residential parcels are exposed to potential flooding from dam failure, with the highest concentrations in Coyote Creek and Indian Valley.⁵⁹

Transportation Infrastructure: Roads, highways, bridges, and transit networks are vulnerable to flooding, landslides, severe weather, and wildfire, especially given the county's challenging geography. Damage to critical routes like SR-20, SR-29, SR-53, and SR-175 can isolate communities, block evacuations, delay emergency response, and disrupt supply chains. Many remote areas depend on single-access roads with few or no alternatives.

Agriculture and Timber Industries: These economic drivers face substantial harm from agricultural pests, drought, extreme temperatures, flooding, severe weather, and wildfire, which threaten crop yields, timber harvests, and the livelihoods of agricultural workers. The wine grape industry, pear production, and other key crops are particularly sensitive to changing climate conditions. In addition to their economic importance, agricultural lands represent a significant portion of the county's assets that are vulnerable to climate-related threats. Across Lake County are over 3,400 agricultural parcels, and the majority of their assessed value—estimated at approximately \$381.8 million—is concentrated in the Local Responsibility Area Fire Hazard Severity Zones. Lands in the State Responsibility Area carry about \$326.4 million in agricultural value.⁶⁰

Forests and Woodland Habitat: These ecosystems are highly vulnerable due to their overlap with high fire severity zones and their susceptibility to drought, extreme heat, and pest infestations. Weakened forest and woodland habitats can ignite more easily during wildfires, creating devastating crown fires. Oak woodlands face threats from sudden oak death and high-intensity wildfires that prevent natural regeneration.

Water and Wastewater Treatment, Delivery, and Collection: Water infrastructure is vulnerable to drought, flooding, landslides, and wildfires. Clear Lake is the primary water supply for a majority of the county. Harmful algal blooms in Clear Lake during drought and extreme heat conditions pose water quality challenges. Reduced groundwater supply during drought threatens the security of domestic and

agricultural water supply. Infrastructure damage can disrupt service delivery and potentially contaminate drinking water.

Other Significant Findings:

- Older adults face unique vulnerabilities due to physical limitations, fixed incomes, and social isolation. In unincorporated Lake County, approximately 25 percent of residents are older adults; in Lakeport, 23 percent of residents are older adults; and in Clearlake, this figure is 18 percent.^{61, 62, 63} Many of these older adults live alone—18 percent in unincorporated Lake County, 22 percent in Lakeport, and 16 percent in Clearlake—which adds another layer of vulnerability during emergencies due to limited communication and mobility challenges.^{64, 65, 66}
- Persons living in manufactured homes, approximately 30 percent of Lake County's housing stock that serves as an efficient and affordable housing option, face specific climate vulnerabilities. Older manufactured homes may have structural limitations that reduce resilience to extreme weather events. Residents in mobile home parks may have fewer options for site-level adaptations such as defensible space improvements or infrastructure upgrades and retrofits, as these decisions often require park owner approval and significant financial investment.
- Isolated communities in the North and East Lake Areas, such as Lake Pillsbury, Witter Springs, and Spring Valley, face challenges accessing emergency services and evacuating during disasters. These communities generally lack public transportation and can be cut off from more populated areas of the county.
- Outdoor recreation and tourism, which are vital economic drivers, are threatened by multiple climate hazards.
- Aquatic habitats face degradation from warming temperatures, altered precipitation patterns, and harmful algal blooms.
- Emergency services may be overwhelmed by increasing demand and disruptions during hazard events. Public transit access, provided by Lake Transit Authority, can be severely limited during and after climate hazard events, isolating transit-dependent populations.

Lake County's Home Insurance Crisis

Property owners and renters have homeowners' or renter's insurance for a variety of reasons, most often to protect the investment(s) made by homeowners and mortgage lenders if damage, loss, or theft happens to the residence. Lake County is home to a population of approximately 67,000 people and 34,500 housing units, with an average household value of approximately \$315,000. Nearly 70 percent of the structures were built prior to 1990. In 2023, only 19,892 homeowners' fire insurance policies were written by insurance companies in the county.

For the past 30 years, California regulations have required insurance companies to apply a catastrophe factor to insurance rates based on historical wildfire losses, which has led to increased rates and premiums following major wildfire disasters. In Lake County, which has experienced 70 percent of the land within its boundaries burned by wildfires since 2015, most residents and property owners have experienced significant changes in their costs and options for homeowners. Property owners face significant increases in home insurance rates or must scramble to find insurance after their providers chose not to renew or to cancel insurance policies in the county.

Sources: U.S. Census Bureau 2023; California Department of Insurance 2024; California Department of Insurance 2024; Lake County 2025.

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RESILIENCE STRATEGIES AND ACTIONS

The Lake County Climate Adaptation Plan provides a comprehensive, collaborative framework, presented in this chapter, for addressing Lake County’s most pressing climate hazards and their impacts on social well-being, natural resources, and the economy. Building community resilience to climate change requires deliberate actions to reduce vulnerabilities, strengthen adaptive capacity, and enhance ability to recover from climate hazards.

Organized around the County’s Pillars of Landscape Resilience, the countywide adaptation goals, strategies, and actions emphasize feasible, cost-effective solutions that protect vulnerable populations, safeguard natural and cultural resources, diversify the economy, and strengthen essential services. Each pillar includes one overarching goal and multiple strategies with implementation actions that address the gaps and vulnerabilities identified above and in the Lake County Climate Vulnerability Analysis.

This plan identifies gaps between current conditions and desired resilience outcomes, then provides strategies to address these gaps. Strategies establish new programs or build on existing programs. Climate adaptation strategies are policies, programs, projects, and actions designed to reduce climate-related risks and build resilience across communities, infrastructure, and natural systems. These strategies work together to help the County and the Cities of Clearlake and Lakeport prepare for, respond to, and recover from climate hazards while maintaining essential services and protecting the most vulnerable populations. Each strategy considers implementation feasibility given available resources in the county and cities. They are designed to be feasible and appropriate for implementation given the available funding and staff capacity, focusing on practical solutions that provide multiple benefits to the community.

Each strategy includes detailed implementation actions with information on responsible agencies, time frames, costs, and potential funding sources. Each action includes the following information to support staff and community implementation:

- **Applicable Jurisdictions:** Lake County, City of Clearlake, and/or City of Lakeport.
- **Action Type:** Programmatic, plans/regulations, capital improvement/infrastructure projects, education/outreach/coordination, evaluation.
- **Responsible Agency:** The County or City department, or Lake County Community Risk Reduction Authority partner agency that will lead implementation.
- **Supporting Agencies/Organizations:** Local organizations, partnerships, departments, or agencies that may help with implementation.
- **Time Frame:**
 - Ongoing, short term (Year 1)
 - Midterm (Year 2–5)
 - Long term (Year 5+)
- **Cost:**
 - Low (Less than \$100k)
 - Medium (\$100k–500k)

RESILIENCE STRATEGIES AND ACTION PLAN

- Medium-high (\$500k–\$2 million)
 - High (\$2 million+)
- **Financial Options:** State, federal, or local grant programs, County or City general funds, or County or City measures.

Many climate adaptation actions in this plan rely on partnerships with organizations within and outside of county and city government that have expertise in specific issues and existing relationships with the community.

- **Lake County Agricultural Commissioner's Office** regulates and supports agricultural activities; administers pest detection programs, sudden oak death monitoring, and agricultural oversight; and partners on climate-resilient agricultural practices.
- **Lake County Fire Safe Council** works to reduce wildfire risk by providing resources, education, and programs to residents and businesses, including preparation and maintenance of the Lake County Community Wildfire Protection Plan.
- **Lake County Office of Climate Resiliency** coordinates countywide climate adaptation efforts; serves as the implementing agency for cross-cutting actions; and facilitates collaboration between departments, jurisdictions, and community partners.
- **Lake County Resource Conservation District** works with landowners, agencies, and community groups to promote conservation and sustainable use of natural resources, providing technical assistance and funding support for soil health, water quality, wildfire resilience, and wildlife habitat.
- **North Coast Opportunities** provides social services, including weatherization programs, workforce development, emergency assistance, and support for vulnerable populations, ensuring climate adaptation efforts reach underserved communities.
- **University of California Cooperative Extension, Lake County**, provides research-based education and technical assistance in agriculture, viticulture, pest management, and livestock operations, helping farmers and land managers adopt climate-resilient practices.

Lake County Climate Adaptation Goals

1. **Air Quality:** Advance community resilience to smoke and poor air quality events.
2. **Biodiversity Conservation:** The county's network of native species and ecological communities is healthy, abundant, and distributed across the landscape to support and sustain their full ecological and cultural roles, furthering countywide climate resilience.
3. **Carbon Sequestration:** Enhanced carbon sequestration capacity across forests, agricultural and working lands, and wetlands to support climate resilience and provide other ecological and community benefits.
4. **Economic Diversity:** A sustainable and resilient natural resource-based economy.
5. **Fire-adapted Communities:** Fire-prepared and resilient communities with the capacity to manage desired fire and suppress unwanted fire while protecting lives, housing, and critical infrastructure.
6. **Fire Dynamics:** Fire burns in an ecologically beneficial and socially acceptable way that perpetuates landscape heterogeneity and rarely threatens human safety or infrastructure.
7. **Forest Resilience:** Resilient forest ecosystems that provide essential ecosystem services, support cultural heritage, and sustain economic opportunities.
8. **Social And Cultural Well-being:** A community connected with nature to recreate, maintain, and improve overall health and contribute to environmental stewardship as a critical component of their identity.
9. **Water Security:** Reliable, safe, and equitable access to clean, potable water for all Lake County communities.
10. **Wetland Integrity:** Protected and restored wetland and riparian ecosystems provide essential ecosystem services, provide natural climate resilience benefits, and are key linkages between upland and aquatic systems in forested landscapes.

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Air Quality

Clean air is essential for health and wellness, clean water, biodiversity, and ecosystem function. Increasing wildfire activity, particularly catastrophic wildfires, due to climate change threatens air quality, particularly for vulnerable groups such as children, unhoused persons, outdoor workers, and older adults. Poor air quality exacerbates existing health issues, often increasing respiratory and cardiovascular diseases. Residents and visitors prefer to enjoy the outdoors when it is safe to breathe, and the skies are clear. Smoke from wildfires discourages recreation and disrupts businesses and local economies.

Adaptation strategies must reduce wildfire smoke impacts through proactive wildfire risk reduction, including prescribed burning and land management techniques that improve forest health and resilience, to minimize large-scale wildfire emissions and protect community well-being. Healthy land management strategies can include using prescribed fire to reduce the risk of uncharacteristic fire and wildfire smoke.

Existing Policies and Programs

- **Lake County Air Quality Management District:** Public health advisories.
- **North Coast Energy Services:** Home weatherization and energy-efficiency upgrades to improve indoor air filtration.
- **Northern Rural Energy Network:** Energy efficiency services and programs targeted at PG&E customers in the residential, commercial, and public sectors.

Identified Gaps

- **Multilingual Communication:** Emergency messaging is largely limited to English and Spanish; other prevalent languages (e.g., German, Pacific Island languages, Arabic, Hindi, Chinese) lack translation or culturally tailored outreach.
- **Protective Equipment Access:** Limited distribution of N95 masks and high efficiency particulate air cleaners for low-income households, outdoor workers, and older adults.
- **Clean Air Centers and Safe Shelters:** No designated public “clean air centers” for older adults, persons with chronic illness, or households in poverty.
- **Targeted Public Health Interventions:** Few programs to proactively engage linguistically isolated or immigrant communities with appropriate guidance for protecting themselves from poor air quality events.
- **Integration into Planning and Operations:** Air quality is not routinely factored into transit scheduling, worker-safety protocols, or economic continuity planning.
- **Economic-Development Coordination:** No formal coordination between economic development programs and air-quality emergency response to support businesses during closures or reduced visitation.

Air Quality

GOAL: ADVANCE COMMUNITY RESILIENCE TO SMOKE AND POOR AIR QUALITY EVENTS.

Strategy 1: Develop and Retrofit Infrastructure for Wildfire Smoke Protection. Continue to invest in community resilience centers that reduce public exposure to wildfire smoke, prioritizing high-need areas and facilities serving sensitive populations.

Action 1.1: Conduct a countywide inventory and assessment of public and community facilities, including libraries, senior centers, schools, and tribal buildings to evaluate their suitability for serving as clean air and cooling centers based on ventilation capacity, HVAC systems, accessibility, and backup power, prioritizing facilities in neighborhoods serving older adults, children, tribal communities, and low-income households. Based on assessment results, coordinate with facility owners to upgrade systems to meet clean air center standards and establish them as seasonal pickup and information sites for clean air kits and related wildfire smoke protection resources. Support and coordinate with existing community resilience center initiatives led by Lake County Community Organizations Active in Disasters partners, including but not limited to, the Lake County Community Foundation and Red Cross.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Evaluation/Capital Improvement/Programmatic

Responsible Agency: Lake County Office of Climate Resiliency

Supporting Agencies/Organizations: County and City Public Works/Services Departments, Lake County Community Organizations Active in Disasters, Community Health Adaptation and Resilience Mobilization Lake County, Tribal governments, Risk Reduction Authority, North Coast Energy Services, local school districts, Lake County Libraries, Office of Emergency Services.

Time Frame: Midterm (Years 2–5)

Cost: Medium (\$100k–\$500k)

Financial Options: Federal Emergency Management Agency Hazard Mitigation Grant Program; Federal Emergency Management Agency Building Resilient Infrastructure and Communities Program; California Strategic Growth Council Community Resilience Centers Grant Program; PG&E Resilience Hubs Grant Program; Cal OES Community Resilience Planning Grants; California Environmental Protection Agency Environmental Justice Small Grants Program; California Department of Public Health Climate Health Resilience Program; County or City general funds; City of Clearlake Measure V.

Action 1.2: Retrofit existing public facilities such as libraries, senior centers, and community centers with high-efficiency particulate air (HEPA) filtration and backup power to serve as clean air centers during wildfire smoke events.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Capital Improvement

Responsible Agency: Lake County Department of Public Services

Supporting Agencies/Organizations: County and City Public Works Departments, Office of Emergency Services, Tribal governments, Lake County Libraries.

Time Frame: Midterm (Years 2–5)

Cost: Medium-High (\$500k–\$2 million)

Financial Options: Federal Emergency Management Agency Building Resilient Infrastructure and Communities Grant; California Strategic Growth Council’s Community Resilience Centers Pilot Program; PG&E Resilience Hubs Grant Program; County or City general funds; City of Clearlake Measure V.

Strategy 2: Expand Community Wildfire Smoke-Response Programs. Coordinate programs that distribute protective equipment and provide clean air services during wildfire smoke-related poor air quality events, with a focus on vulnerable populations.

Action 2.1: Develop a countywide wildfire smoke response program to coordinate purchase and provision of clean air resources and services for vulnerable residents. The program will leverage Lake County Air Quality Management District’s participation in the Community Air Protection Program by integrating its enhanced monitoring network, community partnerships, and public outreach capacity.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Department of Public Health and Lake County Air Quality Management District

Supporting Agencies/Organizations: Risk Reduction Authority, Lake County Air Quality Management District, Lake County Tribal Health Consortium, Lake County Community Organizations Active in Disasters, Tribal representatives, local community-based organizations, and health clinics.

Timeframe: Short term (Year 1)

Cost: Low (Less than \$100,000)

Financial Options: County or City general funds; City of Clearlake Measure V; California Governor’s Office of Emergency Services Preparedness and Resilience Grants; Public Health Emergency Preparedness Cooperative Agreement Program; other State grants.

RESILIENCE STRATEGIES AND ACTION PLAN

Strategy 3: Integrate Air Quality Protocols into Public Operations and Services. Integrate wildfire smoke protection protocols into agency operations, including transit scheduling, outdoor work policies, tourism coordination, and emergency service procedures.

Action 3.1: Formalize compliance with California Division of Occupational Safety and Health wildfire smoke regulations by adopting department-level worker safety protocols that define agency responsibilities, trigger thresholds, and set administrative procedures for limiting outdoor work, modifying schedules, delivering culturally relevant safety training, and providing protective equipment during extreme heat, extreme cold, and wildfire smoke events.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Plans/Regulations

Responsible Agency: County and City Human Resources Departments, County and City Public Works Departments, County and City Parks and Recreation Departments, Lake County Transit Authority, Lake County Special Districts, Fire Districts, local school districts.

Supporting Agencies/Organizations: Local departments of public works and parks and recreation, Cal/OSHA, local labor/union representatives.

Timeframe: Short term (Year 1)

Cost: Low (Less than \$100,000)

Financial Options: Cal/OSHA Worker Safety Grants; County or City general funds; Public Health Emergency Preparedness funds.

Action 3.2: Work with tourism agencies and event organizers to incorporate wildfire smoke-related public health guidance into visitor communications, outdoor program scheduling, and public event management protocols during wildfire smoke events.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: City Parks and Recreation Departments, County Public Services

Supporting Agencies/Organizations: Lake County Economic Development Program, Lake County Economic Development Corporation, Lake County Tourism Improvement District, Lake County Chamber of Commerce, Clearlake Chamber of Commerce, Tribal representatives, local recreation centers, and event organizers.

Timeframe: Midterm (Years 2–5)

Cost: Medium (\$100k–\$500k)

Financial Options: PG&E Better Together Nature Positive Innovation Grant; United States Department of Agriculture Rural Development–Rural Business Development Grants; County or City general funds.



Biodiversity Conservation

Biodiversity plays a major role in our ecosystems and society. Native plants and animals help forests recover after fires, control flooding and soil erosion, and cycle nutrients. Biodiversity also holds cultural value, including traditional Indigenous uses, and provides recreational benefits like wildlife viewing. Greater species diversity promotes adaptability and helps ecosystems withstand and recover from climate disturbances. Climate change threatens biodiversity across Lake County's forests, woodlands, grasslands, agricultural lands, and aquatic habitats through altered temperatures, precipitation patterns, and increased wildfire activity that stress native species while creating favorable conditions for invasive species to establish and spread.

Existing Policies and Programs

- **Lake County Resource Conservation District:** Eight Mile Valley Sediment Reduction and Habitat Enhancement Project, Mendocino Complex Project, Goat's Rue Project, and Caltrans-funded reforestation efforts at Middletown Trailside Park.
- **Blue Ribbon Committee for the Rehabilitation of Clear Lake:** Recommendations for addressing harmful algal blooms, improving fish passage, shoreline and habitat restoration, monitoring and research, community engagement, and funding and recommendations for Clear Lake.
- **Tribal EcoRestoration Alliance:** Biodiversity conservation services including restoration, invasive species removal, and cultural burning activities.
- **Invasive Quagga-Zebra Mussel Monitoring Program:** Lake County Water Resources Department monitoring and data hub for invasive species detection.
- **State Water Resources Control Board:** Clear Lake hitch protection through minimum in-stream flow requirements.
- **Clear Lake Environmental Research Center:** Mediterranean Oak Borer Monitoring Project.
- **Natural Resource Conservation Service:** Environmental Quality Incentives Program.

Identified Gaps

- **Habitat Connectivity Planning:** Lack of habitat connectivity planning across private and public lands.
- **Agricultural Biodiversity Considerations:** Limited biodiversity conservation components in agricultural programs and funding for habitat enhancement on working lands.
- **Traditional Ecological Knowledge:** Lack of systematic integration of traditional ecological knowledge into habitat management.
- **Algal Bloom and Riparian Habitat Management:** Lack of funding to prevent harmful algal blooms and restore riparian habitat.
- **Private Landowner Incentives:** Absence of incentive programs for private landowners to implement biodiversity-friendly practices.

Biodiversity Conservation

GOAL 2: THE COUNTY'S NETWORK OF NATIVE SPECIES AND ECOLOGICAL COMMUNITIES IS HEALTHY, ABUNDANT, AND DISTRIBUTED ACROSS THE LANDSCAPE TO SUPPORT AND SUSTAIN THEIR FULL ECOLOGICAL AND CULTURAL ROLES, FURTHERING COUNTYWIDE CLIMATE RESILIENCE.

Strategy 4: Strengthen Habitat Connectivity and Interagency Coordination. Establish comprehensive coordination between agricultural, natural resource, and tribal agencies to identify key habitats and connections and to improve habitat connectivity planning across private and public lands while integrating traditional ecological knowledge into biodiversity conservation efforts.

Action 4.1: Develop and implement a comprehensive habitat connectivity plan that addresses biodiversity conservation across public and private lands, including wildlife corridors and habitat linkages.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Plans/Regulations

Responsible Agency: Lake County Resource Conservation District

Supporting Agencies/Organizations: County and City Public Works Departments, Tribal governments, Risk Reduction Authority, North Coast Energy Services, local school districts, Lake County Libraries, Office of Emergency Services.

Time Frame: Midterm (Year 2–5)

Cost: Medium (\$100k–\$500k)

Financial Options: California Wildlife Conservation Board grants; Wildlife Crossings Pilot Program federal grants; California Biodiversity Initiative grants; Natural Resource Conservation Service Environmental Quality Incentives Program (EQIP); County or City general funds.

Action 4.2: Coordinate with the Tribal EcoRestoration Alliance to systematically integrate traditional ecological knowledge into public and private habitat management programs and biodiversity conservation planning.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Office of Climate Resiliency

Supporting Agencies/Organizations: Tribal EcoRestoration Alliance, Tribal governments, Lake County Resource Conservation District.

Time Frame: Short term (Year 1)

Cost: Low (Less than \$100k)

Financial Options: Environmental Protection Agency Environmental Justice grants; California Biodiversity Initiative grants; NRCS Environmental Quality Incentives Program (EQIP); tribal partnership funding.

Action 4.3: Create incentive programs for private landowners to implement biodiversity-friendly practices, including pollinator habitat programs and wildlife-friendly farming techniques.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Resource Conservation District

Supporting Agencies/Organizations: UC Cooperative Extension, private agricultural producers.

Time Frame: Midterm (Year 2–5)

Cost: Medium-High (\$500k–\$2 million)

Financial Options: Natural Resource Conservation Service Environmental Quality Incentives Program (EQIP); California Biodiversity Initiative grants; City of Clearlake Measure V.

Strategy 5: Implement Comprehensive Invasive Species Management. Develop and implement an invasive species management program that addresses both aquatic and terrestrial invasive species while supporting native species restoration.

Action 5.1: Establish a comprehensive countywide invasive species management program that includes systematic monitoring, early detection, rapid response protocols, and coordinated control efforts.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Agricultural Commissioner

Supporting Agencies/Organizations: California Invasive Plant Council, Lake County Resource Conservation District, Clear Lake Environmental Research Center, Tribal governments, fire safe councils, fire districts.

Time Frame: Midterm (Year 2–5)

Cost: High (\$2 million+)

Financial Options: California Department of Food and Agriculture invasive species grants; National Invasive Species Information Center Bipartisan Infrastructure Law funding; California Department of Fish and Wildlife Addressing Climate Impacts funding; California Invasive Plant Council grants.

Action 5.2: Work with the California Department of Fish and Wildlife to expand invasive species removal programs, including reestablishing Mute Swan removal and enhancement of carp removal efforts from Clear Lake. (existing program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Capital Improvement/Infrastructure Projects

RESILIENCE STRATEGIES AND ACTION PLAN

Responsible Agency: Lake County Water Resources Department

Supporting Agencies/Organizations: California Department of Fish and Wildlife, Blue Ribbon Committee for the Rehabilitation of Clear Lake, Tribal governments.

Time Frame: Short term (Year 1)

Cost: Medium-High (\$500k–\$2 million)

Financial Options: California Wildlife Conservation Board Fisheries Restoration Grant Program; Blue Ribbon Committee for the Rehabilitation of Clear Lake state funding allocation; California Department of Fish and Wildlife Aquatic Invasive Species grants.

Action 5.3: Provide incentives for local nurseries to increase availability of locally adapted native plant and animal species for restoration projects and private landscaping.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Resource Conservation District

Supporting Agencies/Organizations: California Native Plant Society, UC Cooperative Extension, local plant nurseries.

Time Frame: Midterm (Year 2–5)

Cost: Medium (\$100k–500k)

Financial Options: California Climate Investments; United States Department of Agriculture Rural Business Development Grant Program.

Action 5.4: Continue to implement the Invasive Quagga-Zebra Mussel Monitoring Program and add Golden Mussel Monitoring to existing program. (existing program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Evaluation

Responsible Agency: Lake County Water Resources Department

Supporting Agencies/Organizations: Regional Water Quality Control Board.

Time Frame: Midterm (Year 2–5)

Cost: Medium (\$100k–500k)

Financial Options: California Department of Fish and Wildlife Aquatic Invasive Species Program; US Geological Survey Water Resources Cooperative Program; State Water Resources Control Board Surface Water Ambient Monitoring Program.

Action 5.5 Implement requirements for native plant species in public parks, publicly owned facilities, and private development projects to support pollinator habitat and reduce maintenance needs during drought conditions.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Plans/Regulations

Responsible Agency: Community Development Departments

Supporting Agencies/Organizations: Lake County Resource Conservation District, Parks and Recreation Departments, California Native Plant Society, Public Works Departments.

Time Frame: Midterm (Year 2–5)

Cost: Low (Less than \$100k)

Financial Options: County or City general fund; development impact fees; City of Clearlake Measure V.

Strategy 6: Protect and Restore Aquatic Habitat and Water Quality. Address drought impacts on aquatic habitat through coordinated watershed-scale conservation measures that help restore riparian habitat.

Action 6.1: Work with the Blue Ribbon Committee for the Rehabilitation of Clear Lake to secure funding for the implementation of priority projects for lake restoration, including harmful algal bloom prevention and aquatic species habitat enhancement. (existing program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Water Resources Department

Supporting Agencies/Organizations: Blue Ribbon Committee for the Rehabilitation of Clear Lake, UC Davis Tahoe Environmental Research Center, Tribal governments.

Time Frame: Long term (Year 5+)

Cost: High (\$2 million+)

Financial Options: County or City general funds; California Natural Resources Agency bond funding; Blue Ribbon Committee for the Rehabilitation of Clear Lake state funding.

RESILIENCE STRATEGIES AND ACTION PLAN

Action 6.2: Expand existing riparian habitat restoration programs including the Middle Creek Restoration Project to address watershed-scale connectivity and continue to work with the California Department of Fish and Wildlife implement and enforce minimum instream flow requirements to protect aquatic species during drought conditions. (existing program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Capital Improvement/Infrastructure Projects

Responsible Agency: Lake County Water Resources Department

Supporting Agencies/Organizations: California Department of Fish and Wildlife, Regional Water Quality Control Board, Tribal governments.

Time Frame: Long term (Year 5+)

Cost: High (\$2 million+)

Financial Options: California Wildlife Conservation Board Stream Flow Enhancement Program; Environmental Protection Agency Clean Water Act Section 319 Nonpoint Source Program; California Department of Fish and Wildlife Fisheries Restoration Grant Program.

Action 6.3: Develop public education campaigns on riparian corridor management, including the maintenance regulation for the Clear Lake tule and for private property owners to improve water quality and habitat connectivity.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

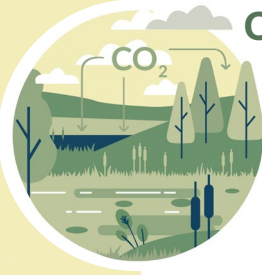
Responsible Agency: Lake County Water Resources Department

Supporting Agencies/Organizations: UC Cooperative Extension, Lake County Resource Conservation District, Clear Lake Clean Water Program.

Time Frame: Short term (Year 1)

Cost: Medium (\$100k–500k)

Financial Options: Environmental Protection Agency Environmental Education Grant Program; California Department of Water Resources Integrated Regional Water Management grants; UC Cooperative Extension Lake County programs.



Carbon Sequestration

Healthy ecosystems and working lands play a critical role in climate resilience by naturally absorbing and storing carbon. Lake County's forests, grasslands, wetlands, and agricultural lands serve as carbon sinks, sequestering carbon dioxide from the atmosphere and storing it in trees, vegetation, and soils. However, climate change threatens these carbon sinks through drought, pest infestations, tree mortality, and wildfires. Approximately 70 percent of the county has burned since 2015, releasing significant stored carbon back into the atmosphere.⁶⁷ Maintaining and enhancing carbon sequestration is essential for maximizing carbon storage and reducing climate change impacts locally and globally.

What Is Carbon Sequestration?

Carbon sequestration is the process by which carbon dioxide is captured from the atmosphere by trees, grasses, and other plants and stored as carbon in biomass and soils. By removing carbon dioxide from the atmosphere—a primary greenhouse gas driving climate change—carbon sequestration in natural and working lands helps reduce global warming while providing co-benefits such as improved soil health, enhanced water quality, wildlife habitat, and increased agricultural productivity.

Existing Policies and Programs

- **Lake County Resource Conservation District:** Reforestation projects.
- **CAL FIRE:** Forest carbon monitoring in Boggs Mountain Demonstration State Forest and in other State Responsibility Areas.
- **Lake County Water Resources Department:** Middle Creek Restoration Project.
- **University of California Cooperative Extension:** Programs on soil health and agricultural practices.
- **Natural Resource Conservation Service:** Environmental Quality Incentives Program.

Identified Gaps

- **Comprehensive Carbon Management:** Lack of countywide carbon management program to coordinate forest carbon enhancement across public and private lands.
- **Carbon Monitoring and Assessment:** Lack of carbon monitoring and accounting systems for forests, wetlands, and agricultural lands to track soil carbon improvements and sequestration effectiveness.
- **Private Landowner Incentives:** Few or no incentives or technical assistance programs for private landowners to implement carbon-enhancing forest management and agricultural practices.
- **Wetland Carbon Enhancement:** No systematic wetland carbon assessment or enhancement program to maximize carbon sequestration benefits.
- **Carbon Program Integration:** Lack of integration of carbon sequestration objectives into existing forest and land management programs.

Carbon Sequestration

GOAL 3: ENHANCED CARBON SEQUESTRATION CAPACITY ACROSS FORESTS, AGRICULTURAL AND WORKING LANDS, AND WETLANDS TO SUPPORT CLIMATE RESILIENCE AND PROVIDE OTHER ECOLOGICAL AND COMMUNITY BENEFITS.

Strategy 7: Natural Carbon Sequestration, Management, and Coordination. Coordinate carbon sequestration and management programs across public and private lands while addressing the restoration needs of fire-damaged ecosystems and preventing future carbon losses.

Action 7.1: Develop a countywide Carbon Sequestration and Management Program, establishing carbon monitoring and accounting systems for forests, wetlands, and agricultural lands.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Resource Conservation District

Supporting Agencies/Organizations: CAL FIRE, private landowners.

Timeframe: Mid-term (Year 2-5)

Cost: Medium (\$100,000–\$500,000)

Financial Options: California Air Resources Board Community Air Protection Program, California Climate Investments, CAL FIRE Forest Health Grant Program, U.S. Forest Service State and Private Forestry grants.

Action 7.2: Coordinate with CAL FIRE to continue to support the Boggs Mountain Demonstration State Forest carbon management activities. (existing program)

Applicable Jurisdictions: County of Lake

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Resource Conservation District

Supporting Agencies/Organizations: CAL FIRE.

Timeframe: Ongoing

Cost: Low (Less than \$100k)

Financial Options: State demonstration forest funding, CAL FIRE Forest Health Grant Program, UC Cooperative Extension grants, California Forest Improvement Program.

Action 7.3: Integrate carbon objectives into existing forest and land management programs. (existing program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Plans/Regulations

Responsible Agency: Lake County Resource Conservation District

Supporting Agencies/Organizations: CAL FIRE, UC Cooperative Extension, Lake County Water Resources Department, fire districts.

Timeframe: Short-term (Year 1)

Cost: Medium (\$100k-500k)

Financial Options: CAL FIRE Forest Health Grant Program, City or County general funds.

Action 7.4: Develop systematic wetland carbon assessment and enhancement programs.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Evaluation

Responsible Agency: Lake County Resource Conservation District

Supporting Agencies/Organizations: California Department of Fish and Wildlife, UC Cooperative Extension.

Timeframe: Mid-term (Year 2-5)

Cost: Medium-High (\$500k-\$2 million)

Financial Options: Environmental Protection Agency Section 319 grants, California Wildlife Conservation Board Stream Flow Enhancement Program, National Science Foundation Long Term Ecological Research grants.

Action 7.5: Coordinate existing vegetation management programs to incorporate carbon sequestration objectives and maximize carbon storage benefits from forest thinning and maintenance operations. (existing program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Community Risk Reduction Authority

Supporting Agencies/Organizations: Fire Safe Councils, United States Forest Service Mendocino National Forest, fire districts, private landowners.

Timeframe: Mid-term (Year 2-5)

Cost: Low (Less than \$100k)

Financial Options: CAL FIRE Fire Prevention Grant Program, United States Forest Service State and Private Forestry Community Forest and Open Space grants, Fire Safe Council funding.

RESILIENCE STRATEGIES AND ACTION PLAN

Action 7.6: Establish biomass utilization and biochar production programs that convert waste woody biomass from forest management, agricultural operations, and defensible space activities into beneficial uses that enhance carbon sequestration and reduce air pollution from pile burning, including bioenergy, biofuels, and long-lived wood products.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Resource Conservation District, Lake County Community Risk Reduction Authority

Supporting Agencies/Organizations: Lake County Agricultural Commissioner's Office, CAL FIRE, UC Cooperative Extension, Fire Safe Councils, private agricultural producers, and timber industry.

Timeframe: Mid-term (Year 2-5)

Cost: Medium-High (\$500k-\$2 million)

Financial Options: California Air Resources Board Biomass Incentive Programs, CAL FIRE Forest Health Grant Program, United States Department of Agriculture Wood Innovation Grant Program, California Climate Investments, California Healthy Soils Program, Natural Resource Conservation Service Environmental Quality Incentives Program (EQIP).

Strategy 8: Carbon-Smart Agricultural and Grassland Practices. Support farmers, ranchers, and landowners in implementing carbon sequestration practices that enhance soil health, improve agricultural resilience, and provide economic benefits while adapting to changing climate conditions.

Action 8.1: Establish an agricultural carbon sequestration program that provides financial incentives for carbon-smart farming practices, technical assistance for soil health improvement, carbon monitoring and verification services, and cost-share funding for equipment and infrastructure.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Resource Conservation District

Supporting Agencies/Organizations: UC Cooperative Extension.

Timeframe: Mid-term (Year 2-5)

Cost: Medium-High (\$500k-\$2 million)

Financial Options: Natural Resource Conservation Service Environmental Quality Incentives Program (EQIP), California Department of Food and Agriculture Healthy Soils Program, California Climate Investments, California Air Resources Board Community Air Protection Program

Action 8.2: Continue to coordinate with UC Cooperative Extension to create an education-based training program that promotes regenerative agriculture and carbon farming techniques, including cover cropping, reduced tillage, managed grazing, and compost application through workshops, field demonstrations, and technical resources for agricultural producers.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Agricultural Commissioner's Office, Lake County Resource Conservation District

Supporting Agencies/Organizations: UC Cooperative Extension Lake County, Natural Resource Conservation Service, local agricultural landowners.

Timeframe: Short-term (Year 1)

Cost: Medium (\$100k-500k)

Financial Options: UC Cooperative Extension grants, United States Department of Agriculture Conservation Innovation Grants, California Healthy Soils Program, California Department of Food and Agriculture Specialty Crop Block Grant Program.

Strategy 9: Carbon Sequestration Considerations in Planning and Development. Incorporate greenhouse gas emissions reduction and carbon sequestration goals into existing policies, programs, and development review and permitting processes to maximize landscape-scale greenhouse gas reduction benefits while supporting sustainable growth patterns.

Action 9.1: Identify countywide greenhouse gas emissions reduction and sequestration goals, adopt a CEQA significance threshold for greenhouse gas emissions to provide a consistent standard for evaluating development projects, and amend land use planning and permitting processes to ensure land development minimizes greenhouse gas emissions and optimizes natural carbon sequestration processes. (existing plan)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Plans/Regulations

Responsible Agency: Lake County Community Development Department, City of Clearlake Community Development Department, City of Lakeport Community Development Department

Supporting Agencies/Organizations: Lake County Office of Climate Resiliency, Lake County Resource Conservation District, Lake County Air Quality Management District

Timeframe: Long-term (Year 5+)

Cost: Medium (\$100k-500k)

Financial Options: California Air Resources Board Incentive Funding for Air Quality Improvement, County or City general fund, permit fee revenue.

RESILIENCE STRATEGIES AND ACTION PLAN

Action 9.2: Evaluate the feasibility of establishing a countywide carbon offset and sequestration program.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Plans/Regulations

Responsible Agency: Lake County Community Development Department

Supporting Agencies/Organizations: Lake County Resource Conservation District, Lake County Office of Climate Resiliency.

Timeframe: Long-term (Year 5+)

Cost: Medium (\$100k-500k)

Financial Options: Development impact fees, City or County general funds, City of Clearlake Measure V.

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Economic Diversity



Economic diversity increases business opportunities that provide regional economic vitality and additional benefits to rural and vulnerable populations. Diverse industries that integrate sustainable practices strengthen the county's economic vitality and resilience. Lake County's communities rely on recreation, tourism, agriculture, and timber economic drivers, all of which are nature based and vulnerable to climate changes. Other important economic drivers such as local government, education, and healthcare are not nature based, but can still be affected by climate change hazards. Diversifying rural economies and investing in climate-resilient land and forest management practices, businesses, and employment opportunities provide sustainable and consistent economic growth that is more resilient to disruption from climate change. For example, resilient forests provide ecosystem services and forest products that in turn provide a foundation for many local and regional economic activities and employment opportunities, including recreation, tourism, and natural resource management industries.

Existing Policies and Programs

- **UC Cooperative Extension Lake County:** Research-based education and technical assistance in diversified agriculture, viticulture, pest management, and livestock operations.
- **United States Department of Agriculture Farm Service Agency**
 - **Livestock Forage Disaster Program:** Financial relief for rangeland losses.
 - **Emergency Forest Restoration Program:** Cost-share for replanting and hazard tree removal after disasters.
- **Lake County Economic Development:** Site selection assistance, marketing collateral, and entrepreneurial support
- **Lake County Tourism Improvement District (Visit Lake County)** – Assessment district focused on increasing visitation through an array of marketing campaigns.
- **Bureau of Indian Affairs Economic Development:** Grants for business planning, infrastructure, and workforce training for Tribes.
- **Lake County Economic Development Corporation:** No-cost Small Business Development Centers entrepreneurial consultation network and USDA revolving loan network.
- **Community Development Services:** Community Development Block Grant microenterprise program, including business operation classes and low-interest revolving loan program.

Identified Gaps

- **Sustained Financial Support:** Programs often provide one-time disaster relief but lack ongoing funding for drought-resilience measures, irrigation upgrades, or pest-management research for farmers and businesses.
- **Economic Diversification:** Insufficient incentives or technical assistance for growers to diversify into less-climate-sensitive crops or value-added agricultural enterprises.
- **Small-Scale and Niche Producer Support:** Programs tend to favor larger operations; emerging sectors (e.g., small acreage specialty crops, agroforestry) lack targeted assistance.
- **Business Continuity Support:** No rapid-response grants or marketing assistance for small tourism operators during hazardous events.
- **Heat and Wildfire Smoke Adaptation Planning:** Emergency plans lack protocols for extreme-heat scheduling and air-quality thresholds for closures for tourism and recreation.
- **Cross-Sector Coordination:** Tourism, public health, and land management agencies are not jointly planning for cascading hazards (e.g., simultaneous flood and fire events).
- **Cross-Jurisdictional Infrastructure Coordination:** Tribal communities lack consistent access to County- and State-managed utilities, broadband, and transportation improvements that support business diversification.
- **Integrated Climate Risk Planning:** Tribal economic development strategies are often siloed from county and local climate adaptation planning, reducing opportunities for shared investments and mutual aid.

Economic Diversity

GOAL 4: A SUSTAINABLE AND RESILIENT NATURAL RESOURCE-BASED ECONOMY.

Strategy 10: Climate-Resilient Agriculture and Small Businesses. Partner with community, business, and academic organizations to help agricultural producers and small business owners identify potential market or other economic disruptions due to climate change and to develop short- and long-term adaptation strategies to sustain the County's agriculture sector.

Action 10.1: Establish a coordinated program to provide tailored technical assistance and grant navigation services for agricultural producers and small rural businesses seeking funding for climate-resilient retrofits, upgrades, or changes in business practices.

Climate Resilient Agriculture Practices

Climate resilient agricultural practices help farmers and the industry as a whole adapt to climate change hazards and reduce greenhouse gas emissions through soil health and carbon sequestration. These practices include crop diversification, soil conservation through cover cropping and reduced tillage, improved water management through efficient irrigation, agroforestry that integrates trees, and integrated pest management.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Economic Development

Supporting Agencies/Organizations: UC Cooperative Extension, United States Department of Agriculture Farm Service Agency, Lake County Economic Development Corporation, local Chambers of Commerce, local business resource centers.

Timeframe: Mid-Term (Year 2–5)

Cost: Medium (\$100k–\$500k)

Financial Options: United States Department of Agriculture Technical Assistance and Outreach Cooperative Agreements, California Department of Food and Agriculture Climate Smart Agriculture Technical Assistance Program, California Department of Water Resources Small Community Drought Relief Program, Good Farm Fund Farm Grant Program, County or City general funds, City of Clearlake Measure V.

RESILIENCE STRATEGIES AND ACTION PLAN

Action 10.2: Work with community partners to establish a regional microgrant program to support small-scale producers, niche agricultural businesses, Tribe-owned businesses, and small businesses to provide rapid financial assistance for hazard preparedness and post-disaster recovery needs with flexible funds for equipment upgrades, product diversification, wildfire smoke protection, and continuity of business operations in an emergency. Prioritize businesses critical to visitor experiences, food supply, medical access, and community gathering, with targeted outreach to underrepresented and rural business owners.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Economic Development

Supporting Agencies/Organizations: North Coast Opportunities, Good Farm Fund, Community Alliance with Family Farmers, Tribal EcoRestoration Alliance, California Association for Microenterprise Opportunity, City of Clearlake Community Development Department, City of Lakeport Community Development Department, California Office of the Small Business Advocate, Lake County Chambers of Commerce, Clear Lake Chamber of Commerce, Lake County Economic Development Corporation.

Timeframe: Mid-Term (Year 2–5)

Cost: Medium (\$100k–\$500k)

Financial Options: United States Department of Agriculture Rural Business Development Grants, California Governor’s Office of Business and Economic Development Grants, California Resilience Challenge Grant, Rural Business Development Grants, California Office of the Small Business Advocate Technical Assistance Expansion Program, Federal Emergency Management Agency Hazard Mitigation Grant Program for business resilience retrofits, County general fund.

Action 10.3: Partner with UC Cooperative Extension and local agricultural organizations to provide workshops and one-on-one technical support that helps agricultural producers transition to climate-resilient practices. (existing program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Resource Conservation District

Supporting Agencies/Organizations: UC Cooperative Extension, Lake County Farm Bureau, Lake County Department of Agriculture, Community Alliance with Family Farmers, Tribal EcoRestoration Alliance, United States Department of Agriculture Natural Resources Conservation Service.

Timeframe: Short-term (Year 1)

Cost: Low (Less than \$100k)

Financial Options: California Department of Food and Agriculture Healthy Soils Program Technical Assistance, United States Department of Agriculture Beginning Farmer and Rancher Development Program, University of California Agriculture and Natural Resources Strategic Initiatives Funding.

Strategy 11: Sustainable Outdoor Recreation Economy. Ensure protection of outdoor recreation visitor and worker health during extreme heat and wildfire smoke events on public lands.

Action 11.1: Identify high-use trailheads, parks, and lakefront access points to protect visitors and outdoor recreation workers during heat events that would benefit from shaded rest areas and hydration stations and install these features as resources allow.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Capital Improvement/Infrastructure Project

Responsible Agency: Lake County Public Services Department, City Parks and Recreation Departments

Supporting Agencies/Organizations: City of Clearlake Public Works and Community Development Departments, City of Lakeport Public Works and Community Development Departments, California State Parks, U.S. Forest Service–Mendocino National Forest, Bureau of Land Management–Berryessa Snow Mountain National Monument.

Timeframe: Mid-Term (Year 2–5)

Cost: Medium-High (\$500k–\$2 million)

Financial Options: California State Parks Recreational Infrastructure Revenue Enhancement Program, California Resilience Challenge Grant, Federal Emergency Management Agency Building Resilient Infrastructure and Communities Program, California Department of Parks and Recreation Land and Water Conservation Fund (LWCF) grants, BLM infrastructure funding, County or City general funds, City of Clearlake Measure V.

Action 11.2: Expand and standardize educational hazard signage at recreation areas in coordination with State, federal, Tribal, and local land managers. Signage at key trailheads, parks, and lakefront access points should include hazard awareness information, protective action guidance, and resources for current conditions such as QR codes linking to LakeCoAlerts, Lake County Air Quality Management District, and Lake County Public Health. Additionally, electronic signage at strategic roadway intersections leading to major recreation areas, where feasible, should include the current air quality index (AQI) value with thresholds, heat risk warnings, and closure notices.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Plans/Regulations

Responsible Agency: Lake County Public Services Department

RESILIENCE STRATEGIES AND ACTION PLAN

Supporting Agencies/Organizations: City of Clearlake Public Works and Community Development Departments, City of Lakeport Public Works and Community Development Departments, Lake County Office of Emergency Services, Lake County Air Quality Management District, Tribal governments, Lake County Public Health Department, California State Parks, U.S. Forest Service – Mendocino National Forest, Bureau of Land Management – Berryessa Snow Mountain National Monument.

Timeframe: Short-Term (Year 1)

Cost: Low (<\$100k)

Financial Options: CAL FIRE Community Wildfire Preparedness and Mitigation Grants; California Governor’s Office of Emergency Services–Hazard Mitigation Grant Program; U.S. Forest Service cooperative agreement funding; BLM Recreation Site Management Funds; County or City general funds; City of Clearlake Measure V.

Action 11.3: Partner with local businesses, Tribal governments, and tourism organizations to identify critical infrastructure gaps for addressing climate risks to the local outdoor recreation economy and prioritize those in capital improvement plans.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Recreation Agency

Supporting Agencies/Organizations: City of Clearlake Public Works and Community Development Departments, City of Lakeport Public Works and Community Development Departments, Tribal governments, Lake County Marketing and Economic Development Program, North Coast Opportunities, Visit Lake County Tourism Bureau, Lake County Public Services Dept

Timeframe: Ongoing

Cost: Medium (\$100k–\$500k)

Financial Options: Regional Climate Collaboratives Program, Integrated Climate Adaptation and Resiliency Program, County or City general funds, City of Clearlake Measure V.

Action 11.4: Assist recreation-dependent business districts in Lakeport, Clearlake, and unincorporated gateway communities to prepare for climate-related hazards. Provide technical assistance for developing hazard-specific continuity plans, diversifying revenue streams, identifying alternative operating models during closures, and accessing financial relief programs.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake Recreation Joint Powers Authority

Supporting Agencies/Organizations: City of Clearlake Administrative Services Department, City of Lakeport City Manager’s Office, Visit Lake County Tourism Bureau, local Chambers of Commerce, Lake County Office of Climate Resiliency, North Coast Opportunities, Tribal governments.

Timeframe: Mid-Term (Years 2–5)

Cost: Medium (\$100k–\$500k)

Financial Options: California Office of the Small Business Advocate Small Business Resiliency Program, California Strategic Growth Council Regional Climate Collaboratives Program, California Governor’s Office of Planning and Research – Integrated Climate Adaptation and Resiliency Program, County or City general funds, City of Clearlake Measure V.

Action 11.5: Develop a program to provide outdoor recreation business operators and outdoor recreation workers with multilingual climate hazard safety training, protective equipment, and protocols for modifying operations during hazardous conditions.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic; Education/Outreach/Coordination

Responsible Agency: Lake County Public Health Department

Supporting Agencies/Organizations: Lake County Workforce Development Board, Tribal governments, California Human Development – Lakeport Office, California Farmworker Foundation, Visit Lake County Tourism Bureau, California State Parks, U.S. Forest Service – Mendocino National Forest, Bureau of Land Management – Berryessa Snow Mountain National Monument.

Timeframe: Short-Term (Year 1)

Cost: Medium (\$100k–\$500k)

Financial Options: California Workforce Development Board High Road Training Partnerships, Federal Emergency Management Agency Hazard Mitigation Grant Program, California Division of Occupational Safety and Health Worker Safety Grants Listos California Statewide Grant Program; County or City general funds.

Strategy 12: Support for Vulnerable Businesses. Ensure small businesses have equitable access to hazard preparedness resources and recovery aid before, during, and after climate-related disruptions.

Action 12.2: Develop a centralized climate and economic resilience indicators dashboard to track the impacts of climate-related disruptions (e.g., wildfire smoke, drought, extreme heat) on local businesses and agriculture, with disaggregated data by location, income level, and business type.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Evaluation

Responsible Agency: Lake County Economic Development

Supporting Agencies/Organizations: City of Clearlake Community Development Department, City of Lakeport Community Development Department, California Office of the Small Business Advocate, Lake County Chambers of Commerce, California Association for Microenterprise Opportunity, University of California Cooperative Extension, Lake County Department of Agriculture, Lake County Farm Bureau.

Timeframe: Mid-Term (Year 2–5)

RESILIENCE STRATEGIES AND ACTION PLAN

Cost: Medium (\$100k–\$500k)

Financial Options: California Strategic Growth Council – Regional Climate Collaboratives Program, U.S. Economic Development Administration Planning and Technical Assistance Grants, Federal Emergency Management Agency Hazard Mitigation Planning Grants, California Office of the Small Business Advocate Technical Assistance Expansion Program.

Action 12.3: Evaluate participation outcomes in workforce development and technical assistance programs that build climate hazard preparedness, emergency response capacity, and business continuity skills for small business owners and employees in tourism, recreation, and essential service sectors.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Evaluation

Responsible Agency: Workforce Alliance of the North Bay

Supporting Agencies/Organizations: Tribal EcoRestoration Alliance, Redwood Community College District / Mendocino College, North Coast Opportunities, California Workforce Development Board, City of Clearlake Administrative Services Department, City of Lakeport City Manager's Office.

Timeframe: Ongoing

Cost: Low (<\$100k)

Financial Options: California Workforce Development Board High Road Training Partnerships, Bureau of Indian Affairs Workforce Development Grant, Community Economic Resilience Fund, Department of Labor Workforce Innovation and Opportunity Act Grants, Tribal Compact funds.

Strategy 13: Tribal Economic Sovereignty. Support Tribal governments in aligning economic development and workforce training with countywide climate resilience priorities, ensuring coordinated efforts for resilient economic development.

Action 13.1: Coordinate with Tribal governments to identify opportunities for joint infrastructure investments (e.g., broadband, utilities, transportation) that support Tribal business resilience. (Existing coordination)

Applicable Jurisdictions: County of Lake

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Economic Development

Supporting Agencies/Organizations: Tribal governments, Bureau of Indian Affairs–Division of Economic Development, Lake County Office of Climate Resiliency

Timeframe: Mid-Term (Year 2–5)

Cost: Medium (\$100k–\$500k)

Financial Options: Indian Community Development Block Grant, Bureau of Indian Affairs Tribal Broadband Connectivity Program, California Advanced Services Fund – Tribal Technical Assistance, Federal Emergency Management Agency Building Resilient Infrastructure and Communities Program, California Resilience Challenge Grants.

Action 13.2: Partner with Tribal governments to design and implement workforce development pathways that support and incorporate traditional ecological knowledge, include paid apprenticeships or certifications, and are led or co-led by Tribal instructors or organizations.

Applicable Jurisdictions: County of Lake

Action Type: Programmatic

Responsible Agency: Lake County Economic Development

Supporting Agencies/Organizations: Tribal EcoRestoration Alliance, Lake County Office of Climate Resiliency, Mendocino College / Redwood Community College District, UC Cooperative Extension, California Indian Manpower Consortium, California Workforce Development Board.

Timeframe: Mid-Term (Year 2–5)

Cost: Medium (\$100k–\$500k)

Financial Options: Indian Community Development Block Grant, Bureau of Indian Affairs Workforce Development Grants, California Workforce Development Board – High Road Training Partnerships, Community Economic Resilience Fund.

Action 13.3: Work with Tribal governments to seek funding and partnership opportunities to expand and foster a robust bioeconomy.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education, Outreach, Coordination

Responsible Agency: Lake County Economic Development

Supporting Agencies/Organizations: Tribal Governments, Tribal EcoRestoration Alliance, Workforce Alliance of the North Bay, Lake County Office of Climate Resilience, California Workforce Development Board.

Timeframe: Mid-Term (Year 2–5)

Cost: Low (Less than \$100k)

Financial Options: Bureau of Indian Affairs Workforce Development Grants, California Workforce Development Board – High Road Training Partnerships, Community Economic Resilience Fund.

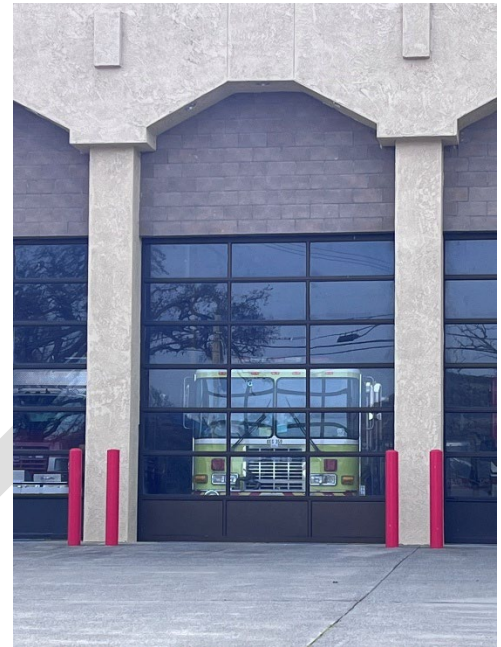
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Fire-Adapted Communities

Communities must be prepared to coexist with fire. This includes developing the capacity to implement defensible space, using fire-safe building practices, and maintaining effective evacuation routes. Equitable outreach and preparedness programs are essential to reduce risk and build public awareness in high-fire-risk areas. Due to climate change and other drivers, wildfires increasingly threaten homes and communities, especially in the wildland-urban interface. Fire adapted communities are knowledgeable and engaged. They accept fire as part of the surrounding landscape, take action to reduce their vulnerability to fire, and adapt to live safely with fire.



Existing Policies and Programs

- **Lake County Emergency Communications:** Countywide alerts through LakeCoAlerts, including Spanish translations and in-language support.
- **Lake County Fire Safe Council:** Community education on evacuation routes, community chipping days, targeted vegetation thinning along high-risk roadways, “Reflect to Protect” initiative, neighborhood fuel break maintenance; assists vulnerable residents, such as older adults and those with limited mobility, with defensible space program.
- **Firewise USA Program:** Supports neighborhood-level wildfire risk reduction and community preparedness planning.
- **CAL FIRE Fire Risk Reduction Community List:** Prioritized list of communities for vegetation management, defensible space programs, and other fire mitigation funding and resources.
- **Defensible-Space Inspections:** CAL FIRE and local fire protection districts conduct inspections to enforce and promote compliance with state defensible-space requirements around homes.
- **State Parks, U.S. Forest Service, and Bureau of Land Management outreach:** Visitor safety briefings and interpretive programs on wildfire risk.
- **Board of Forestry California Vegetation Treatment Program (CalVTP):** Streamlines CEQA compliance for vegetation management projects in State Responsibility Areas, supporting prescribed fire, thinning, herbivory, and other treatments to reduce wildfire risk.
- **PG&E Vegetation Management:** Required fuel reduction around power lines and substations in compliance with California Public Utilities Commission (CPUC) regulations.
- **Community Wildfire Protection Plan (CWPP):** Can provides neighborhood-level fuel-reduction guidelines and identifies priority treatment zones to reduce wildfire risk and protect evacuation routes.

RESILIENCE STRATEGIES AND ACTION PLAN

- **Tribal EcoRestoration Alliance Cultural Burning:** Integrates Indigenous practices to manage fuels in forested and agricultural lands and builds local capacity for cultural and ecological burns.
- **Firefighting Linked Auxiliary Supply Hydraulic Energy Storage (FLASHES) Project:** High-elevation storage tanks creating roughly 90 million gallons of stored water above SR-29 act as a firefighting resource by supplying sprinkler coverage, helicopter dip tanks and rapid refill stations.

Identified Gaps

- **Multilingual Communication:** Opportunity to expand emergency messaging beyond English and Spanish to achieve greater inclusivity and reach to vulnerable populations. Pacific Island languages, Arabic, Hindi, Chinese, and German speakers lack coverage.
- **Resource Access and Trust:** Immigrant households remain disconnected from recovery resources due to fear or mistrust of public systems, which discourages help seeking and engagement.
- **Education and Outreach:** Public education and outreach efforts do not reach all populations, particularly isolated older adults, low-income households, and residents in isolated communities. These groups often face barriers to receiving timely information about wildfire preparedness, evacuation planning, and available support services.
- **Fire Resilient Housing:** Low-income renters and low-income and limited income manufactured-home residents and owners often lack the financial resources, legal authority, or labor support needed to implement fire-resilient upgrades.
- **Evacuation Network:** Many communities rely on single-access roads, with few or no redundant evacuation routes, posing serious safety risks during wildfire events.
- **Vegetation Management:** Although strategic roadside fuel-reduction efforts exist, inconsistent implementation and maintenance along key evacuation routes may leave certain areas vulnerable during wildfire emergencies.
- **Service Redundancy:** Limited electricity, cellular, and broadband systems in rural areas, which can hinder response during emergencies.
- **Resilience Planning:** Wildfire resilience is minimally integrated into countywide infrastructure planning, with limited coordination across power systems, communications networks, and evacuation routes.

Fire-Adapted Communities

GOAL 5: FIRE-PREPARED AND RESILIENT COMMUNITIES WITH THE CAPACITY TO MANAGE DESIRED FIRE AND SUPPRESS UNWANTED FIRE WHILE PROTECTING LIVES, HOUSING, AND CRITICAL INFRASTRUCTURE.

Strategy 14: Multi-cultural Outreach and Education. Provide multilingual and culturally relevant fire-adapted communities education programs.

Action 14.1: Partner with community-based organizations and Tribes, such as the Tribal EcoRestoration Alliance's Lake EcoCultural Cal-TREX program, to deliver multilingual, culturally relevant wildfire, defensible space, and vegetation management education outreach through workshops, door-to-door campaigns, community presentations, mobile alerts, and printed materials distributed at community hubs. (Existing program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Office of Climate Resiliency; Lake County Resource Conservation District

Supporting Agencies/Organizations: Fire Districts, Tribal EcoRestoration Alliance, City of Clearlake Administrative Services Department, City of Lakeport Community Development Department, North Coast Opportunities, Lake County Public Health, Fire Districts, Lake County Office of Emergency Services.

Timeframe: Short-Term (Year 1)

Cost: Low to Medium (\$100k–\$500k)

Financial Options: Federal Emergency Management Agency Hazard Mitigation Grant Program, California Climate Investments – Community Outreach Grants, CDPH Climate Health Resilience Grant, PG&E Public Safety Partner Grants, County or City general funds, City of Clearlake Measure V.

Action 14.2: Partner with outreach teams, community health workers, and Lake County Continuum of Care to deliver fire safety education and emergency alerts to persons experiencing homelessness and transient workers.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Social Services

RESILIENCE STRATEGIES AND ACTION PLAN

Supporting Agencies/Organizations: Lake County Continuum of Care, Red Cross Climate Adaptation Program, Hope Center, Lake County Haven, Lake County Public Health Department, North Coast Opportunities, Adventist Health Clear Lake outreach teams, California Human Development, Lake County Office of Emergency Services, local faith-based organizations, and shelters.

Timeframe: Short-Term (Year 1)

Cost: Low (<\$100k)

Financial Options: Federal Emergency Management Agency Hazard Mitigation Grant Program, Listos California Community Resilience Microgrants, California Department of Public Health – Climate and Health Equity Grants, PG&E Public Safety Outreach Grants, County or City general funds.

Strategy 15: Fire-Resilient Housing. Develop targeted programs to assist homeowners and renters with reduction of wildfire risk to their homes and properties through fire-resilience retrofits, including funding to implement home hardening and defensible space.

Action 15.1: Partner with North Coast Opportunities' Lake County Home Hardening Program and Clearlake Environmental Research Center (CLERC) to expand funding and technical assistance programs (i.e., application support and local contractor referrals) to support retrofits, home hardening, defensible space, and ignition-resistant upgrades for low-income homeowners and manufactured home residents, including labor-support for vegetation management activities and home upgrades. (Existing program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic; Education/Outreach/Coordination

Responsible Agency: Community Development Departments

Supporting Agencies/Organizations: North Coast Energy Services, North Coast Opportunities, Fire Safe Councils, Fire Districts, CAL FIRE, Lake County Resource Conservation District, Legal Services of Northern California, California Department of Housing and Community Development, Fire Safe Councils, Lake County Resource Conservation District, Clear Lake Environmental Research Center, Red Cross Climate Adaptation Program

Timeframe: Mid-Term (Year 2–5)

Cost: Medium to High (\$500k–\$2 million)

Financial Options: CAL FIRE Fire Prevention and Home Hardening Grants, Federal Emergency Management Agency Hazard Mitigation Grant Program, United States Department of Agriculture Rural Development Home Repair Loans and Grants, State and federal Retrofit Grant Programs, State Community Development Block Grants, Indian Community Development Block Grants, Cal OES Residential Mitigation Program, California Housing Finance Agency Wildfire Rebuilding Funds, County or City general funds.

Action 15.2: Develop an assistance program to provide renters with access to funding for fire-resilience upgrades, such as defensible space, wildfire smoke filtration, and ember-resistant retrofits. Such a program should include support for tenant-landlord coordination, labor support for vegetation management activities, incentives for voluntary landlord participation, and partnerships with housing advocates to minimize eviction risk related to safety upgrades. Engage property managers and landlords through multilingual outreach and provide recognition or certification for fire-resilient rental properties.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Administration Department

Supporting Agencies/Organizations: Lake County Community Development Departments, City of Clearlake Community Development Department, City of Lakeport Community Development Department, California Rural Legal Assistance, North Coast Energy Services, Clear Lake Environmental Research Center, Lake County Resource Conservation District, North Coast Opportunities, Red Cross Climate Adaptation Program, CAL FIRE, Fire Safe Councils, Fire Districts.

Timeframe: Mid-Term (Year 2–5)

Cost: Medium (\$100k–\$500k)

Financial Options: CAL FIRE Fire Prevention and Home Hardening Grants, Federal Emergency Management Agency Pre-Disaster Mitigation Program, State Community Development Block Grants, PG&E Wildfire Mitigation and Safety Grants, Low-Income Home Energy Assistance Program, Energy Savings Assistance Program.

Strategy 16: Community-Scale Resilience. Support neighborhood scale vegetation management and defensible space maintenance, especially in high-risk or underserved areas.

Action 16.1: As part of the community resilience center planning process, identify essential service facilities in high-risk or remote areas to identify gaps and prioritize backup systems that can function during wildfire-related outages.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Capital Improvement/Infrastructure Projects

Responsible Agency: County of Lake Public Services

Supporting Agencies/Organizations: Lake County Office of Emergency Services, City of Clearlake Public Works Department, City of Lakeport Public Works Department, Red Cross Climate Adaptation Program, Clear Lake Environmental Research Center, Lake County Resource Conservation District, PG&E, Lake County Department of Information Technology, Lake County Health Services Department, Lake County Office of Education.

Timeframe: Mid-Term (Year 2–5)

Cost: High (\$2 million+)

Financial Options: California Office of Emergency Services Hazard Mitigation Grant Program, PG&E Community Resilience Program, U.S. Department of Energy Grid Resilience and Innovation Partnerships Program, Federal Emergency Management Agency Building Resilient Infrastructure

RESILIENCE STRATEGIES AND ACTION PLAN

and Communities Program, United States Department of Agriculture Community Facilities Direct Loan and Grant Program, County or City infrastructure bonds, County or City general funds, City of Clearlake Measure V.

Action 16.2: Conduct a managed retreat feasibility study for relocated housing and key services in Very High Fire Hazard Severity Zones to areas less fire prone. The study should assess mechanisms such as Transfer of Development Rights (TDR) programs, land acquisition programs, conservation easements, and incentive-based buyout programs that allow property owners to voluntarily relocate homes and key community services from the highest-risk areas to safer locations while preserving property rights and providing equitable compensation.

Applicable Jurisdictions: County of Lake

Action Type: Evaluation

Responsible Agency: Fire Safe Councils in Lake County

Supporting Agencies/Organizations: Lake County Fire Safe Council, South Lake Fire Safe Council, Konocti Fire Safe Council, Redbud Fire Safe Council, County of Lake Community Development Department, City of Clearlake Community Development Department, City of Lakeport Community Development Department, Fire Districts, Utility Districts.

Timeframe: Mid-Term (Year 2–5)

Cost: Medium (\$100-500k)

Financial Options: California Fire Safe Council Grants, Federal Emergency Management Agency Hazard Mitigation Grant Program.

Action 16.3: Support installation of commercial-scale water storage tanks in Very High Fire Hazard Severity Zones to enhance fire suppression capacity and provide water access for both emergency responders and agricultural landowners.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Capital Improvement/Infrastructure Projects

Responsible Agency: Lake County Community Risk Reduction Authority, fire protection districts

Supporting Agencies/Organizations: Lake County Fire Safe Council, CAL FIRE, Lake County Resource Conservation District, Agricultural Commissioner's Office.

Timeframe: Mid-Term (Year 2–5)

Cost: High (\$500k-\$5M+)

Financial Options: California Fire Safe Council Grants, Federal Emergency Management Agency Hazard Mitigation Grant Program, California Climate Investments, USDA Rural Development.

Strategy 17: Resilient Infrastructure in Isolated and High-Risk Communities. Invest in backup power, communication systems, and cooling/warming facilities for remote or underserved communities lacking reliable cell service, internet, or transportation access during fire emergencies.

Action 17.1: Support neighborhood-scale fuel-reduction coordination by funding or training local volunteer teams and partnering with trusted community organizations. Prioritize communities with limited emergency access, high social vulnerability, or large manufactured-home populations.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Resource Conservation District

Supporting Agencies/Organizations: Red Cross Climate Adaptation Program, Clear Lake Environmental Research Center, Clear Lake Environmental Research Center, Community Emergency Response Team, North Coast Opportunities, Tribal Governments, U.S. Forest Service.

Timeframe: Short-Term (Year 1)

Cost: Low (<\$100k)

Financial Options: California Fire Safe Council Grants, Federal Emergency Management Agency Hazard Mitigation Grant Program, PG&E Wildfire Mitigation and Resilience Grants, United States Department of Agriculture Community Facilities Technical Assistance and Training Grants, County or City general funds.

Action 17.2: Support the Fire Safe Councils in Lake County in seeking additional funding to educate the community on Zone Zero requirements and home hardening implementation. (Existing coordination)

Applicable Jurisdictions: County of Lake

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Community Risk Reduction Authority

Supporting Agencies/Organizations: North Coast Opportunities, Lake County Office of Emergency Services, All Fire Safe Councils, Tribal Governments, Fire Districts, Office of Climate Resiliency, Community Development Departments

Timeframe: Short-term (Year 1)

Cost: Low (< \$100k)

Financial Options: Bureau of Indian Affairs Tribal Climate Resilience Program, Federal Emergency Management Agency Building Resilient Infrastructure and Communities Program, PG&E Wildfire Safety and Resiliency Program, County or City general funds.

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Action 17.3: Identify priority public roadways for vegetation clearance and streamline vegetation maintenance. Continue to coordinate efforts among public works departments, Fire Districts, and Caltrans to ensure consistent and timely vegetation clearance. (Existing coordination)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Evaluation

Responsible Agency: Public Works Departments

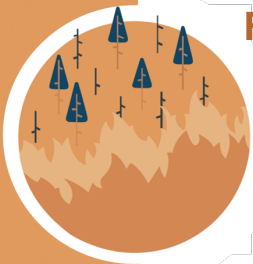
Supporting Agencies/Organizations: Caltrans, CAL FIRE, Fire Safe Councils, Lake County Resource Conservation District, Tribal Governments, Bureau of Land Management, California State Parks, U.S. Forest Service.

Timeframe: Short-Term (Year 1)

Cost: Low (<\$100k)

Financial Options: CAL FIRE Fire Prevention Grants, Federal Highway Administration Emergency Relief Program, Federal Emergency Management Agency Building Resilient Infrastructure and Communities Program, Federal Emergency Management Agency Hazard Mitigation Grant Program, PG&E Vegetation Management Funding, City of Clearlake Measure V.

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Fire Dynamics

Fire is an integral part of Lake County's forest ecosystems with traditional tribal burning practices managing the forests for thousands of years. Prescribed and managed wildfires informed by tribal-culture practices can reduce hazardous fuel buildup, support habitat health, and restore natural fire regimes. Supporting prescribed and managed wildfires to burn primarily at low to moderate severity in a mosaic pattern that covers large areas would provide substantial ecological benefits. Because climate change generally increases the severity of fire dynamics, managing such dynamics will continue to grow in importance. Adaptation strategies must expand capacity and social acceptance for integrating tribal ecological knowledge and proactive fire use under controlled conditions.

Existing Policies and Programs

- **CAL FIRE Prescribed Fire Training Programs:** Hands-on training in conducting controlled burns to reduce hazardous fuels and restore fire regimes. Workshops and demonstrations for landowners, including vineyard and timber operators, on integrating controlled burns.
- **South Lake County Fire Safe Council Fuels Management:** Community fire safety education, including workshops to help neighborhoods become Firewise communities; assistance in developing community fire plans; distribution of fire safety preparedness materials; shaded fuel break projects; and inexpensive chipping services to reduce wildfire hazards in South Lake County.
- **Northshore Fire Protection District Hazard Reduction:** Prescribed fire and mechanical thinning operations on district lands to improve firefighter and worker safety.
- **Hogback Ridge Crew:** A program of the Northshore Fire Protection District available county-wide for fuels reduction work.
- **Tribal EcoRestoration Alliance Cultural Burning:** Integrates Indigenous practices to manage fuels in forested and agricultural lands and builds local capacity for cultural and ecological burns.
- **State Parks Fuel Management:** Prescribed burns and thinning around campgrounds, trails, and other high-use recreational areas.
- **Federal Fuel Management by U.S. Forest Service and Bureau of Land Management:** Prescribed burns and thinning around campgrounds, trails, and other high-use recreation areas.

Identified Gaps

- **Industry-Specific Education:** Insufficient education tailored to integrating prescribed fire into standard agricultural and timber operations.
- **Assistance Program Limitations:** Limited financial and technical assistance programs specifically designed to help farm and timber enterprises implement fuel reduction and other wildfire resilience practices.
- **Pace and Scale of Fuel Management:** The scale and pace of fuel-management projects, including prescribed burns, are too limited to meet ecological needs for healthy fire regimes or to keep up with wildfire risk in high-use recreation areas.
- **Personnel Shortage:** Shortage of qualified personnel certified to conduct controlled burns and mechanical treatments.
- **Public Perception and Liability:** Public misunderstanding and resistance to prescribed fire due to wildfire smoke and liability concerns.
- **Permitting and Coordination Delays:** Permitting challenges and complex cross-agency approval processes slow implementation.

Fire Dynamics

GOAL 6: FIRE BURNS IN AN ECOLOGICALLY BENEFICIAL AND SOCIALLY ACCEPTABLE WAY THAT PERPETUATES LANDSCAPE HETEROGENEITY AND RARELY THREATENS HUMAN SAFETY OR INFRASTRUCTURE.

Strategy 18: Permitting and Partnerships for Landscape-Scale Prescribed Fire. Develop shared prescribed and cultural fire protocols and increase the scale of planned burns through joint agreements in partnership with local Tribes.

Action 18.1: Work with the Tribal EcoRestoration Alliance, Fire Districts, Lake County Prescribed Fire Association, and Fire Safe Councils to improve interagency communication, align permitting requirements, and coordinate landscape-scale burns on public and private lands. (Existing coordination)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Air Quality Management District

Supporting Agencies/Organizations: CAL FIRE, Tribal EcoRestoration Alliance, Fire Safe Councils, fire districts, Lake County Resource Conservation District, U.S. Forest Service–Mendocino National Forest, Bureau of Land Management–Berryessa Snow Mountain National Monument, California State Parks, Tribal governments.

Timeframe: Short-Term (Year 1)

Cost: Low (<\$100k)

Financial Options: CAL FIRE Fire Prevention Grants, Regional Forest and Fire Capacity Program, Federal Emergency Management Agency Hazard Mitigation Grant Program, North Coast Resource Partnership.

Action 18.2: Develop and implement a Tribal-led prescribed and cultural fire manual, stewardship framework, and training program that documents traditional fire practices, integrates traditional ecological knowledge, and provides guidance to local agencies, landowners, and community members on incorporating prescribed burns into regional fire management. The program should include modular training tailored for landowners, outdoor workers, timber and agriculture operators, and other stakeholders and be supported by in-field demonstrations and workshops. (Existing Program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Plans/Regulations; Education/Outreach/Coordination

Responsible Agency: Tribal EcoRestoration Alliance

RESILIENCE STRATEGIES AND ACTION PLAN

Supporting Agencies/Organizations: Tribal governments, CAL FIRE, Fire Districts, UC Cooperative Extension, U.S. Forest Service – Mendocino National Forest, Bureau of Land Management, Lake County Resource Conservation District, California Conservation Corps, Fire Safe Councils, Lake County Office of Climate Resiliency

Timeframe: Mid-Term (Year 2–5)

Cost: Medium (\$100k–\$500k)

Financial Options: Bureau of Indian Affairs Tribal Climate Resilience Program, Indian Community Development Block Grant, Regional Forest and Fire Capacity Program, AL FIRE Workforce Development and Fire Prevention Grants, CAL FIRE Forest Health and Cultural Fire Funding, California Climate Investment – Fire Prevention Grants, Federal Emergency Management Agency Hazard Mitigation Grant Program, United States Department of Agriculture Beginning Farmer and Rancher Development Program.

Strategy 19: Fuel-Reduction Projects in High-Use Recreation and Visitor Zones. Identify capital projects that reduce wildfire risk in visitor-serving areas.

Action 19.1: Identify and map priority recreation areas, such as campgrounds, lakefront parks, and trailheads that are vulnerable to wildfire and implement shaded fuel breaks, defensible space buffers, and fire-adapted landscaping to reduce wildfire risk and protect visitor safety.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Capital Improvement/Infrastructure Project

Responsible Agency: Lake County Department of Public Services, City Parks and Recreation Departments or Lake County Recreation Agency

Supporting Agencies/Organizations: City of Clearlake Public Works Department, City of Lakeport Public Works Department, Tribes, Fire Safe Councils, Lake County Resource Conservation District, Lake County Fire Safe Council

Timeframe: Midterm (Year 2–5)

Cost: Medium-High (\$500k–\$2 million)

Financial Options: CAL FIRE Fire Prevention Grants; Federal Emergency Management Agency Building Resilient Infrastructure and Communities Program; California State Parks Outdoor Equity Grants; United States Department of Agriculture Community Wildfire Defense Grants; PG&E Resilience Partnership Funding.

Action 19.2: Partner with recreation operators to develop an education program to improve visitor understanding of prescribed fire and fire-adapted practices in recreation areas.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Recreation Agency

Supporting Agencies/Organizations: City of Clearlake Community Development Department, City of Lakeport Community Development Department, Lake County Office of Climate Resiliency, County and City Parks and Recreation Departments, California State Parks, U.S. Forest Service–Mendocino National Forest, Bureau of Land Management–Berryessa Snow Mountain National Monument, Fire Safe Councils, Visit Lake County Tourism Bureau.

Timeframe: Short term (Year 1)

Cost: Low (Less than \$100k)

Financial Options: CAL FIRE Fire Prevention Grants; Federal Emergency Management Agency Hazard Mitigation Grant Program; United States Department of Agriculture Community Wildfire Defense Grants; State Parks Interpretation Grants; North Coast Resource Partnership Implementation Funding for Lake Pillsbury area.

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Forest Resilience

Resilient forests provide many ecosystem services, including wildlife habitat, clean water, stable soils, recreational opportunities, biodiversity, wood products, and carbon sequestration. Vegetation composition and structure that align with topography, disturbance regimes, and landscape conditions play an important role in both mitigating and adapting to climate change. Across the landscape, management activities and natural disturbances should maintain desired forest conditions, including forest heterogeneity and wildlife habitat. Lake County's extensive forests and woodlands are highly vulnerable to climate change through drought, extreme heat, pest infestations, and increased wildfire activity. Tree mortality due to bark and ambrosia beetles and diseases like sudden oak death further reduces forest resilience. Lake County is experiencing a tree mortality crisis, with annual dead trees increasing from 3,000 in 2019 to 79,000 by 2023.⁶⁸ Forest degradation threatens culturally significant sites for tribal communities and compromises watershed function, affecting water quality for the 60 percent of county residents who depend on Clear Lake as their drinking water source.⁶⁹

Existing Policies and Programs

- **Community Wildfire Protection Plan:** Collaborative plan providing fuel reduction project recommendations and fire safety guidance, overseen by Lake County Fire Safe Council.
- **CAL FIRE:** Forest management activities on State Responsibility Areas and Tribal Wildfire Resilience Program offering technical assistance and funding for cultural burning.
- **Lake County Tree Mortality Program:** Coordinates documentation of dead/dying trees near roadways, partners with state and federal agencies for funding and technical assistance.
- **Lake County Agricultural Commissioner's Office:** Pest Detection Program, Pest Exclusion Program, sudden oak death monitoring, and regular nursery inspections.
- **Lake County Resource Conservation District:** Technical assistance and education for integrated pest management, forest health project coordination, and erosion control.
- **Tribal EcoRestoration Alliance:** Provides forest restoration services, including vegetation thinning, native seed collection, tree planting, and prescribed/cultural burning activities.
- **Lake County Code of Ordinances:** Chapter 3, Article I, "Pests and Diseases", helps safeguard native plants and agriculture from invasive plants or pathogens. Chapter 30, "Grading Ordinance", helps prevent erosion, protect habitat and water quality, and guide appropriate vegetation removal. Chapter 21, Articles 4 and 6, "Agricultural and Timberland Preserve Zone" regulations, help keep forested and rural lands intact, support responsible management, and prevent fragmentation.

Identified Gaps

- **Tribal Knowledge Integration:** No systematic integration of traditional ecological knowledge into forest management.
- **Comprehensive Watershed-Forest and Water Quality Coordination:** Programs operate independently, without integrated watershed-scale forest management planning, and lack coordination between water agencies and forest managers for water quality benefits.
- **Tribal-Led Stewardship Funding:** Limited dedicated funding streams for tribal forest stewardship and formal consultation protocols for cultural resource decisions.
- **Private Landowner Forest Management:** Limited incentives and technical assistance for resilience-building forest management practices on private lands.



Forest Resilience

GOAL 7: RESILIENT FOREST ECOSYSTEMS THAT PROVIDE ESSENTIAL ECOSYSTEM SERVICES, SUPPORT CULTURAL HERITAGE, AND SUSTAIN ECONOMIC OPPORTUNITIES.

Strategy 20: Tribal Knowledge Integration and Partnerships. Continue to work with tribal governments and the Tribal EcoRestoration Alliance to systematically integrate traditional ecological knowledge into countywide forest management programs on both public and private lands.

Action 20.1: Coordinate with the Tribal EcoRestoration Alliance to expand systematic integration of traditional ecological knowledge into countywide forest management planning and implementation processes. (existing programs)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Office of Climate Resiliency

Supporting Agencies/Organizations: Tribal EcoRestoration Alliance, Big Valley Band of Pomo Indians, Elem Indian Colony, Habematolel Pomo of Upper Lake, Koi Nation of Northern California, Middletown Rancheria of Pomo Indians, Robinson Rancheria Pomo Indians of California, Scotts Valley Band of Pomo Indians.

Time frame: Midterm (Year 2–5)

Cost: Medium (\$100k–500k)

Financial Options: Bureau of Indian Affairs Tribal Climate Resilience Program; CAL FIRE Tribal Wildfire Resilience Program; California Climate Investments.

Action 20.2: Support tribal governments in establishing formal consultation protocols for cultural resource decisions affecting tribes on publicly owned forested lands.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Resource Conservation District

Supporting Agencies/Organizations: Community Development Departments, Tribal EcoRestoration Alliance, Lake County Community Risk Reduction Authority, Tribal governments.

Time frame: Ongoing/Short term (Year 1)

Cost: Low (Less than \$100k)

Financial Options: Indian Community Development Block Grant; Bureau of Indian Affairs Economic Development grants; CAL FIRE Forest Health and Cultural Fire Funding; California Forest Improvement Program.

RESILIENCE STRATEGIES AND ACTION PLAN

Action 20.3: Continue to support and expand the Tribal EcoRestoration Alliance's forest restoration services, including prescribed and cultural fires. (existing program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Capital Improvement/Infrastructure Projects

Responsible Agency: Lake County Resource Conservation District

Supporting Agencies/Organizations: Tribal EcoRestoration Alliance, CAL FIRE, United States Forest Service–Mendocino National Forest, Tribal governments.

Time frame: Ongoing

Cost: Medium-High (\$500k–\$2 million)

Financial Options: CAL FIRE Forest Health Grant Program; Regional Forest and Fire Capacity Program; United States Department of Agriculture Emergency Forest Restoration Program; California Forest Improvement Program.

Strategy 21: Forest Health and Pest Management. Expand comprehensive forest health monitoring and integrated pest management programs to address pests and diseases affecting forest resilience across public and private lands.

Action 21.1: Expand the Lake County Tree Mortality Program to include comprehensive forest health assessment systems and monitoring of ecosystem transitions from forest to grassland/shrubland. (existing program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Evaluation

Responsible Agency: Clear Lake Environmental Research Center

Supporting Agencies/Organizations: Lake County Risk Reduction Authority, Lake County Office of Climate Resiliency, Lake County Agricultural Commissioner, University of California Cooperative Extension, Natural Resource Conservation Service.

Time frame: Long term (Year 5+)

Cost: Medium-High (\$500k–\$2 million)

Financial Options: CAL FIRE Forest Health Grant Program; United States Department of Agriculture Forest Service State and Private Forestry grants; California Disaster Assistance Act funding.

Action 21.2: Enhance the Agricultural Commissioner's Pest Detection Program, Pest Exclusion Program, and sudden oak death monitoring to include comprehensive surveillance for emerging forest pests and diseases. (existing programs)

Applicable Jurisdictions: County of Lake

Action Type: Programmatic

Responsible Agency: Lake County Agricultural Commissioner's Office

Supporting Agencies/Organizations: UC Cooperative Extension, CAL FIRE.

Time frame: Midterm (Year 2–5)

Cost: Medium (\$100k–500k)

Financial Options: California Department of Food and Agriculture Pest Detection grants; United States Department of Agriculture Plant Protection Act funding; City or County general funds.

Action 21.3: Establish incentive programs for private landowners to implement resilience-building forest management practices, including pest infestation management, replanting of native plant communities, and hazard tree removal.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Resource Conservation District

Supporting Agencies/Organizations: Natural Resources Conservation Service, CLERC, CAL FIRE, Fire Districts, private forest landowners.

Time frame: Long term (Year 5+)

Cost: Medium (\$100k–500k)

Financial Options: Natural Resource Conservation Service Environmental Quality Incentives Program; CAL FIRE Vegetation Management grants; United States Department of Agriculture Emergency Forest Restoration Program; Wildlife Conservation Board Oak Woodlands Conservation Program.

Action 21.4: Develop an integrated watershed-scale forest health and water quality coordination program between water agencies and forest managers to address the relationship of forest health and forest management practices to the quality of public drinking water sources.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Watershed Protection District

Supporting Agencies/Organizations:

Time frame: Midterm (Year 2–5)

Cost: Low (Less than \$100k)

Financial Options: Environmental Protection Agency Section 319 grants; Safe Drinking Water State Revolving Fund; United States Forest Service State and Private Forestry grants.

RESILIENCE STRATEGIES AND ACTION PLAN

Strategy 22: Sustainable Timber Products and Recreation Economy. Promote sustainable timber harvesting, biomass utilization, and forest-based recreation opportunities that provide economic co-benefits while enhancing forest resilience.

Action 22.2: Update County Code of Ordinances Chapter 21, Articles 4 and 6, Agricultural and Timberland Preserve Zone regulations, to incorporate climate resilience and carbon sequestration objectives into timber management requirements, such as reforestation with climate-adapted species, retention of large trees, sustainable harvest rotation schedules, and requirements for carbon impact assessments in timber harvest plans. (existing program)

Applicable Jurisdictions: Lake County

Action Type: Plans/Regulations

Responsible Agency: Lake County Community Development Department

Supporting Agencies/Organizations: Lake County Agricultural Commissioner's Office, timber industry representatives.

Time frame: Short term (Year 1)

Cost: Low (Less than \$100k)

Financial Options: County or City general fund; planning fee revenue.

Social and Cultural Well-Being

Lake County forests allow people to build and maintain active cultural and social connections to a place. Resilient landscapes offer opportunities for people to connect with the natural environment through recreation experiences, culturally valued resources, and engagement in natural resource management and conservation. Adaptation planning must recognize these values and ensure that all residents, especially tribes and vulnerable communities, have access to healthy landscapes and meaningful participation in their stewardship.

Existing Policies and Programs

- **LakeCoAlerts:** Countywide notifications for emergency events, with Spanish translations.
- **North Coast Opportunities:** Community-based, language assistance, and preparedness workshops.
- **La Voz de la Esperanza Centro Latino:** Wellness center in Clearlake offering peer support, mental-health services, and help accessing emergency resources for the Spanish-speaking community.
- **Pay-Your-Pal:** Volunteer driver program for older adults and people with disabilities.
- **Lake Transit Authority, Ride-Links, Dial-A-Ride, and Flex Stop:** Volunteer and paratransit rides to medical appointments and essential services.
- **General Plan Environmental Justice Element:** Identifies actions to reduce pollution exposure, improve air quality, and prioritize investments in disadvantaged communities.
- **Lake County Tribal Health Consortium:** Satellite clinics in Middletown, Clearlake, and Lakeport offer comprehensive health care for tribal individuals and families as well as non-tribal members in the community.
- **Lake County Vector Control District:** Conducts surveillance and management of mosquitoes and other pests that carry diseases.
- **The California Department of Public Health Climate Change and Health Equity Program:** Strengthens local public health departments and engages communities to increase their role in decision-making.
- **Community Health Adaptation and Resiliency Mobilizing (CHARM Lake County):** A collaboration of Big Valley Band of Pomo Indians and Tracking California, with guidance and support from the CHARM Lake County Working Group, to build capacity and improve response for extreme heat and harmful algal bloom events.

Identified Gaps

- **Language and Cultural Barriers:** Multilingual outreach is inconsistent, with limited translations beyond Spanish. German, Pacific Island languages, Hindi, Chinese, and Arabic are largely unsupported, and outreach materials and enrollment processes are not always designed for limited literacy or non-English speakers.
- **Lack of Inclusive Signage and Materials:** Public spaces and recreation areas on County- and City-managed lands seldom feature culturally relevant wayfinding and safety information.
- **Remote Area Service Shortfalls:** Limited transportation to services and in-home medical care options outside the cities of Clearlake and Lakeport.
- **ADA Compliance and Accessibility Gaps:** While Lake County and the cities of Clearlake and Lakeport have made significant accessibility improvements to parks and recreational areas over the past decade, opportunities remain to expand accessibility features at additional publicly owned facilities and trails. This includes evaluating needs for accessible routes, rest areas with seating and shade, and wayfinding signage that meets current ADA standards for height, contrast, and tactile elements.
- **Targeted Climate-Ready Programs for Low-Income Households:** Few local initiatives to prepare low-income households for wildfire, flood, extreme heat, or other hazard events.
- **Sustainable Funding:** Tribal-led programs rely on short-term or competitive grants, hindering program security.
- **Staffing and Equipment Reliability:** Volunteer fatigue and outdated apparatus reduce readiness and response effectiveness during prolonged or multiple hazard events.
- **Remote Area Access and Service Gaps:** Isolated communities in the North Lake and East Lake areas face challenges accessing emergency services and receiving timely emergency communications. There is a lack of transportation links to cities and reliance on single access roadways. Limited cellular and broadband connectivity in certain areas hinders emergency response coordination and communication. Limited public transit service in remote areas can be severely disrupted during and after climate hazard events.
- **Resilience of Services:** Little redundancy or backup systems at critical facilities.

Social and Cultural Well-Being

GOAL 8: A COMMUNITY CONNECTED WITH NATURE TO RECREATE, MAINTAIN, AND IMPROVE OVERALL HEALTH AND CONTRIBUTE TO ENVIRONMENTAL STEWARDSHIP AS A CRITICAL COMPONENT OF THEIR IDENTITY.

Strategy 23: Culturally Tailored Communication. Improve coordination with community organizations and tribal partners to deliver climate hazard information in multiple languages and culturally relevant formats.

Action 23.1: Partner with community-based organizations and Tribal governments to co-develop culturally appropriate materials on the impacts of climate change hazards to residents and their communities and how to increase resilience and respond to emergency events. Materials should be available in English, Spanish, and other languages commonly spoken locally. Outreach should explain climate risks, emergency alerts, and protective actions (e.g., use of N95 masks, high efficiency particulate air purifiers, emergency cooling, and evacuation planning) and be delivered through multiple channels, including in-person engagement, social media, radio, and printed formats.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Department of Public Health

Supporting Agencies/Organizations: Lake County Office of Education, Lake County Tribal Health Consortium, local health clinics, faith-based groups, Lake County Social Services, Lake County Office of Emergency Services, Tribal governments, California Farmworker Foundation, California Human Development–Lakeport Office, County community health workers, Lake County Farm Bureau, local nonprofits.

Time frame: Midterm (Years 2–5)

Cost: Medium (\$100k–\$500k)

Financial Options: California Department of Public Health Climate Health Resilience Program; California Environmental Protection Agency Environmental Justice Small Grants Program; PG&E Better Together Nature Positive Innovation Grant; Listos California Statewide Grant Program; Listos California Target Grant Program; County or City general funds; City of Clearlake Measure V.

RESILIENCE STRATEGIES AND ACTION PLAN

Action 23.2: Enhance existing climate resilience and hazard preparation website resources to create a unified, multilingual information hub that improves accessibility and usability for Lake County residents. Work with Lake County Office of Emergency Services, Office of Climate Resiliency, and city departments to streamline navigation between existing websites, eliminate duplicative content, and fill information gaps. Prioritize mobile-friendly design and integration of community-specific resources. Coordinate with Tribal governments, service providers, and community-based organizations to ensure the site's content reflects local needs and integrates traditional knowledge, where appropriate. (existing program and coordination)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination; Programmatic

Responsible Agency: Lake County Office of Climate Resilience

Supporting Agencies/Organizations: Lake County Department of Public Health, Tribal governments, Lake County Office of Education, Lake County Office of Emergency Services, Lake County Social Services, Lake County Area Agency on Aging, Lake County Tribal Health Consortium, local labor groups, senior service providers, local libraries, community-based organizations, faith based groups, farmworker housing providers.

Time frame: Short term (Year 1)

Cost: Medium (\$100k–\$500k)

Financial Options: PG&E Better Together Nature Positive Innovation Grant; Cal OES Listos California Emergency Preparedness Campaign; California Department of Aging Home and Community Based Services Program; Listos California Statewide Grant Program; Listos California Target Grant Program; County or City general funds; City of Clearlake Measure V.

Strategy 24: Inclusive Climate Adaptation. Advance equitable access to climate resilience resources.

Action 24.1: Coordinate with Tribal governments, community-based organizations, and local service providers to continue to deliver in-person all hazard preparedness education (including climate hazards), distribute protective equipment, and provide transportation or mobile services for resilience programs for residents with limited transportation options.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination; Programmatic

Responsible Agency: Lake County Community Risk Reduction Authority

Supporting Agencies/Organizations: Tribal governments, Lake County Social Services, North Coast Opportunities, Red Cross Climate Adaptation Program, Lake County Transit Authority, local faith-based organizations, community health workers.

Time frame: Midterm (Years 2–5)

Cost: Medium (\$100k–\$500k)

Financial Options: Federal Emergency Management Agency Hazard Mitigation Grant Program; California Office of Emergency Services Preparedness and Resilience Grants; United States Department of Agriculture Rural Development Community Facilities Program; Listos California Statewide Grant Program; County or City general funds; City of Clearlake Measure V.

Action 24.2: Partner with Lake County Community Organizations Active in Disaster to continue to assess and address accessibility barriers in emergency shelters and resilience centers, including physical access, assistive technologies, and communication support for individuals with mobility, sensory, and cognitive disabilities, incorporating findings from CHARM Lake County's community assessment.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Evaluation

Responsible Agency: Lake County Office of Emergency Services, Lake County Community Risk Reduction Authority

Supporting Agencies/Organizations: North Coast Opportunities, Red Cross Climate Adaptation program, Lake County COAD, Climate Health Adaptation and Resilience Mobilizing (CHARM) Lake County, Tribal governments.

Time frame: Midterm (Years 2–5)

Cost: Medium (\$100k–\$500k)

Financial Options: California Office of Emergency Services Access and Functional Needs Planning Grants; County or City general funds; City of Clearlake Measure V.

Action 24.3: Continue and expand the Northern Rural Energy Network (NREN) low-income home weatherization and energy efficiency program to improve resilience to extreme heat, wildfire smoke, and winter storms. Prioritize upgrades such as insulation, weather-stripping, air sealing, and installation of HEPA-equipped HVAC systems in homes of older adults, people with disabilities, and low-income households, including those in remote areas. (existing program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic; Capital Improvement/Infrastructure Projects

Responsible Agency: Lake Area Planning Council

Supporting Agencies/Organizations: Lake County Office of Climate Resilience, Lake County Social Services, Lake County Department of Public Health, PG&E, community-based organizations.

Time frame: Ongoing

Cost: Medium-High (\$500k–\$2 million)

Financial Options: Low-Income Home Energy Assistance Program; California Department of Community Services and Development Weatherization Assistance Program; California Energy Commission Low-Income Energy Efficiency Program; PG&E Energy Efficiency Rebates and Incentives; County or City general funds; City of Clearlake Measure V.

RESILIENCE STRATEGIES AND ACTION PLAN

Action 24.4: Establish targeted outreach to recreation operators and develop recreational opportunities that support environmental and forest stewardship education, including interpretive signage on trails, educational programming on traditional ecological knowledge, volunteer stewardship activities, and enhanced conservation and restoration demonstration areas.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Capital Improvement/Infrastructure Projects

Responsible Agency: Lake County Economic Development Corporation

Supporting Agencies/Organizations: California State Parks, United States Forest Service–Mendocino National Forest, Bureau of Land Management–Berryessa Snow Mountain National Monument, recreation operators.

Time frame: Long term (Year 5+)

Cost: Medium-High (\$500k–\$2 million)

Financial Options: California Outdoors for All grants; California State Parks Natural Resources Program funding; Land and Water Conservation Fund (LWCF) grants.

Action 24.5: Conduct a resilience audit of critical publicly owned infrastructure in remote and underserved areas to identify vulnerabilities in power supply, broadband, and emergency radio networks. Use findings to identify needs for infrastructure retrofits, backup power installations, and communication upgrades.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Evaluation

Responsible Agency: Lake County Public Services, City of Clearlake Public Works, City of Lakeport Public Works

Supporting Agencies/Organizations: PG&E, Caltrans, Lake County Information Technology Department, United States Department of Agriculture Rural Utilities Service.

Time frame: Short term (Year 1)

Cost: Medium-High (\$500k–\$2 million)

Financial Options: CPUC Broadband Equity Access and Deployment Program; Federal Emergency Management Agency Building Resilient Infrastructure and Communities Program; United States Department of Agriculture Rural Development Grants; County or City general funds; City of Clearlake Measure V.

Strategy 25: Public Health Resilience to Climate Hazards. Integrate public health considerations into emergency planning, outreach, and climate resilience programs.

Action 25.1: Expand access to mobile clinics that provide heat illness prevention services and respiratory health care. Focus on communities that lack nearby healthcare facilities and prioritize residents with occupational exposure, such as outdoor workers in agriculture, construction, landscaping, and recreation. (existing program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Department of Public Health

Supporting Agencies/Organizations: Lake County Tribal Health Consortium, Adventist Health Clear Lake, Sutter Lakeside Hospital and Clinics, Mendocino Community Health Clinic–Lakeview Health Center, North Coast Opportunities.

Time frame: Short term (Year 1)

Cost: Medium (\$100k0–\$500k)

Financial Options: Federal Health Resources and Services Administration Grants; California Department of Public Health Climate Health Resilience Program; County general funds; Indian Health Service.

Action 25.2: Expand climate-related public health outreach programs that deliver heat illness prevention, respiratory health education, and preparedness guidance to high-risk populations. (existing outreach)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Department of Public Health

Supporting Agencies/Organizations: Lake County Tribal Health Consortium, Adventist Health Clear Lake, Sutter Lakeside Hospital and Clinics, Mendocino Community Health Clinic–Lakeview Health Center, North Coast Opportunities, California Farmworker Foundation, California Human Development–Lakeport Office, faith-based organizations, other local healthcare providers.

Time frame: Short term (Year 1)

Cost: Low (Less than \$100k)

Financial Options: California Department of Public Health Climate Health Resilience Program; California Environmental Protection Agency Environmental Justice Small Grants Program; Listos California Statewide Grant Program; County or City general funds; City of Clearlake Measure V.

RESILIENCE STRATEGIES AND ACTION PLAN

Action 25.3: Assess the readiness of local healthcare system to respond to climate-exacerbated events such as extreme heat, wildfire smoke, and power outages. Identify gaps in staffing, equipment, backup power, and patient communication, with a focus on reaching medically vulnerable and outdoor worker populations.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Evaluation

Responsible Agency: Lake County Department of Public Health

Supporting Agencies/Organizations: Lake County Tribal Health Consortium, Adventist Health Clear Lake, Sutter Lakeside Hospital and Clinics, Mendocino Community Health Clinic–Lakeview Health Center, North Coast Opportunities, California Department of Public Health.

Time frame: Midterm (Years 2–5)

Cost: Medium (\$100k–\$500k)

Financial Options: California Department of Public Health Climate Health Resilience Program; California Environmental Protection Agency Environmental Justice Small Grants; HRSA Rural Health Care Program; County or City general funds; City of Clearlake Measure V.

Strategy 26: Inclusive Leadership and Community Co-governance. Increase formal participation of Tribes, disability advocates, immigrant-serving organizations, and other underrepresented groups in climate adaptation decision-making to ensure diverse cultural values, lived experiences, and accessibility needs are embedded in local resilience strategies and land stewardship.

Action 26.1: Establish a County Climate Equity and Accessibility Advisory Committee as a subcommittee of the Lake County Community Risk Reduction Authority with representation from Tribes, disability advocates, immigrant-serving groups, and low-income residents to inform planning, monitor progress, and co-design climate resilience programs. Membership should include representatives from Tribes, the cities of Clearlake and Lakeport, the Lake County Office of Emergency Services, Department of Public Health, Public Works, and Community Development to ensure recommendations can be integrated into decision-making and implementation processes.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Risk Reduction Authority

Supporting Agencies/Organizations: City of Clearlake and City of Lakeport departments, relevant County departments (Public Health, Public Works, Community Development, Office of Emergency Services), Lake County Office of Climate Resiliency, Tribal governments, North Coast Opportunities, La Voz de la Esperanza, local community foundations.

Time frame: Short term (Year 1)

Cost: Low (Less than \$100k)

Financial Options: California Environmental Protection Agency Environmental Justice Small Grants Program; California Strategic Growth Council Regional Climate Collaboratives; County or City general funds; City of Clearlake Measure V.



Water Security

Resilient forested watersheds are critical for regional and statewide water security. Forests serve as natural water collection, storage, filtration, and delivery systems that will become more important as climate change intensifies. Lake County faces significant water security challenges due to reliance on limited water sources that are vulnerable to drought and water quality issues. Clear Lake serves as the primary drinking water source for approximately 60 percent of county residents, and groundwater supplies the majority of agricultural, visitor-serving, and remaining domestic water needs. Climate change threatens water security through drought conditions that lower water levels, extreme heat that contributes to harmful algal blooms, and severe weather that can damage water infrastructure. Over 80 public and private entities manage water service in Lake County, most serving fewer than 3,000 connections, which limits the capacity for long-term planning and coordination during emergencies.

Existing Policies and Programs

- **Lake County Water Resources and Watershed Protection District:** Clear Lake Ambient Monitoring Program with monthly physical, chemical, and biological water quality data collection from the three arms of Clear Lake since 1960s.
- **Lake County Drought Resilience Plan:** A plan to assist water purveyors and small users in building resilient supplies and infrastructure.
- **Clear Lake Source Watershed Assessment Plan:** Collaborative sanitary survey document assessing public water system capability to supply safe drinking water with Natural Resource Conservation Service grant funding.
- **Blue Ribbon Committee for the Rehabilitation of Clear Lake:** 15-member committee created by Assembly Bill 707 and making recommendations for rehabilitating Clear Lake through scientific research and restoration projects.
- **Big Valley Band of Pomo Indians:** Creation of Clear Lake water quality monitoring programs and cyanotoxin monitoring efforts for harmful algal bloom protection.
- **Habematolel Pomo of Upper Lake:** Partnership with United States Environmental Protection Agency providing National Environmental Information Exchange Network Grant for water quality data collection.
- **UC Davis/Tahoe Environmental Research Center:** Multiyear scientific research contract for Clear Lake rehabilitation with dedicated data portal and wind mapping.
- **U.S. Geological Survey:** Hydrological and aquatic ecology studies, including active gaging stations, water quality monitoring, and watershed monitoring of Clear Lake tributaries.
- **San Francisco Estuary Institute:** Harmful Algal Bloom Satellite Analysis Tool monitoring and mapping cyanobacteria presence.
- **Big Valley Groundwater Sustainability Agency:** Groundwater Management Plan and monitoring groundwater levels during drought periods.
- **Westside Sacramento Integrated Regional Water Management Plan:** Five-county collaborative approach, including assessment of water supply reliability and monitoring of groundwater conditions.

RESILIENCE STRATEGIES AND ACTION PLAN

- **Lake County Groundwater Management Plan:** Lake County Watershed Protection District guidance for managing county groundwater resources.
- **Individual Water Providers:** Emergency response plans for 80+ public and private water entities, including special district systems, mutual water companies, and private utilities.
- **Community Health Adaptation and Resiliency Mobilizing (CHARM Lake County):** A collaboration of Big Valley Band of Pomo Indians and Tracking California, with guidance and support from the CHARM Lake County Working Group.
- **Clear Lake Environmental Research Center:** Lab provides the only accredited microbiology lab in Lake County and serves drinking water systems.
- **Firefighting Linked Auxiliary Supply Hydraulic Energy Storage (FLASHES) Project:** High-elevation storage tanks creating roughly 90 million gallons of stored water and operating up to three Pelton turbines above SR-29 will act as a firefighting resource and renewable energy source.

Identified Gaps

- **Planning and Implementation Coordination:** Despite extensive scientific data and monitoring, lack of comprehensive planning and implementation framework to act on research findings and coordinate response across agencies.
- **Data Integration and Coordination:** Multiple water quality monitoring programs operate with limited coordination and data integration across platforms.
- **Regional Emergency Coordination:** Programs operate independently without comprehensive coordination mechanisms between numerous water providers during multisystem emergencies.
- **Infrastructure Vulnerability Assessment:** Comprehensive infrastructure vulnerability assessments for climate hazards lacking across water systems.
- **Small Water System Support:** Limited technical and financial assistance for small water systems to address algal bloom treatment, infrastructure hardening, and climate adaptation beyond existing grant programs.
- **Harmful Algal Bloom Early Warning:** Despite satellite monitoring tools, lack of integrated early warning system connecting monitoring data to public health response.
- **Long-term Funding Sustainability:** Dependence on grant funding for critical monitoring programs creates uncertainty for continuous long-term water quality assessment.

Water Security

GOAL 9: RELIABLE, SAFE, AND EQUITABLE ACCESS TO CLEAN, POTABLE WATER FOR ALL LAKE COUNTY COMMUNITIES.

Strategy 27: Water Quality Monitoring and Improvement. Strengthen collaborative water quality monitoring and response programs to address harmful algal blooms (HAB), legacy contamination, and land use impacts on water quality.

Action 27.1: Continue to support the efforts of the Blue Ribbon Committee for the Rehabilitation of Clear Lake to secure State funding and implement priority projects for harmful algal bloom prevention, mercury remediation, and water quality improvement in Clear Lake. (existing program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Watershed Protection District

Supporting Agencies/Organizations: Lake County Water Resources Department, San Francisco Estuary Institute, Tribes, U.S. Environmental Protection Agency, State Water Resources Control Board, water providers.

Time frame: Midterm (Year 2–5)

Cost: Medium (\$100k–500k)

Financial Options: Safe Drinking Water State Revolving Fund; Environmental Protection Agency Public Water System Supervision grants; Center for Disease Control Environmental Health Tracking grants.

Action 27.2: Establish integrated early warning systems that connect San Francisco Estuary Institute Harmful Algal Bloom Satellite Analysis Tool monitoring data to County public health response protocols and water treatment decisions.

Applicable Jurisdictions: Evaluation

Action Type: Lake County Department of Public Health

Responsible Agency: Lake County Department of Public Health

Supporting Agencies/Organizations: Lake County Water Resources Department, San Francisco Estuary Institute, Blue Ribbon Committee for the Rehabilitation of Clearlake, Tribes, water providers.

Time frame: Midterm (Year 2–5)

Cost: Medium (\$100k–500k)

Financial Options: Safe Drinking Water State Revolving Fund; Environmental Protection Agency Public Water System Supervision grants; Center for Disease Control Environmental Health Tracking grants.

RESILIENCE STRATEGIES AND ACTION PLAN

Action 27.3: Coordinate with the U.S. Environmental Protection Agency to accelerate remedial actions at the Sulphur Bank Mercury Mine Superfund Site and monitor impacts on Clear Lake water quality and Tribal community health.

Applicable Jurisdictions: Lake County

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Environmental Health Department

Supporting Agencies/Organizations: California Environmental Protection Agency, Regional Water Quality Control Board, Elem Indian Colony, California Department of Toxic Substances Control.

Time frame: Long term (Year 5+)

Cost: High (\$2 million+)

Financial Options: Environmental Protection Agency Superfund Remedial Program funding; Environmental Protection Agency Environmental Justice Small Grants Program; City or County general funds.

Action 27.4: Integrate existing data gathering efforts currently underway around Clear Lake to improve regional water quality management and reduce data silos.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Evaluation, Education/Outreach/Coordination

Responsible Agency: Lake County Watershed Protection District

Supporting Agencies/Organizations: Tribal governments, UC Davis Tahoe Environmental Research Center, Lake County Environmental Health Department, Regional Water Quality Control Board.

Time frame: Midterm (Year 2–5)

Cost: Medium (\$100k–500k)

Financial Options: National Environmental Information Exchange Network Grant; United States Geologic Survey Water Cooperative Program; California State Water Resources Control Board Surface Water Ambient Monitoring Program.

Action 27.5: Establish sewer line and septic tank inspections within a 100-foot buffer zone of riparian corridors and lake shorelines consistent with Lake County creek setback ordinances and state water quality protection standards to identify failing or at-risk systems that may contribute to water quality degradation.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Health Services

Supporting Agencies/Organizations: Blue Ribbon Committee for the Rehabilitation of Clear Lake, Lake County Special Districts, City of Lakeport, Tribal governments, Central Valley Regional Water Quality Control Board.

Time frame: Short term (Year 1)

Cost: Low (Less than \$100k)

Financial Options: City or County general funds.

Action 27.6: Develop a program that provides technical assistance and financial incentives for properties with aging or failing septic systems within 100 feet of waterways within existing sewer district service areas to connect to municipal sewer systems.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Department of Public Health

Supporting Agencies/Organizations: Blue Ribbon Committee for the Rehabilitation of Clear Lake, Lake County Special Districts, City of Lakeport, Tribal governments, Central Valley Regional Water Quality Control Board.

Time frame: Short term (Year 1)

Cost: Medium (\$100k-\$500k)

Financial Options: City or County general funds.

Action 27.7: Develop and implement a comprehensive non-point source pollution prevention education campaign to reduce contamination of Clear Lake and local waterways, addressing sources such as pet waste management, proper trash disposal, illegal dumping prevention, residential chemical use, septic system maintenance, and other land-based pollutants that affect water quality.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Department of Water Resources

Supporting Agencies/Organizations: Lake County Environmental Health Department, Clear Lake Clean Water Program, Lake County Resource Conservation District, Regional Water Quality Control Board, Lake County Public Services Department.

Time frame: Mid-term (Year 2-5)

RESILIENCE STRATEGIES AND ACTION PLAN

Cost: Medium-High (\$500k-\$2 million)

Financial Options: California State Water Resources Control Board Clean Water State Revolving Fund, Environmental Protection Agency Clean Water Act Section 319 Nonpoint Source Program, United States Department of Agriculture Rural Development Water and Waste Disposal Loans and Grants, Blue Ribbon Committee funding, County or City sewer connection fee revenue, City or County general funds.

Strategy 28: Water Supply Infrastructure and Emergency Coordination. Improve resilience and reliability of water sources and water delivery and treatment infrastructure.

Action 28.1: Develop integrated emergency water supply planning and coordination mechanisms between all public and private water entities during multi-system emergencies, droughts, and Public Safety Power Shutoff (PSPS) events.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Plans/Regulations

Responsible Agency: Lake County Office of Climate Resiliency

Supporting Agencies/Organizations: Lake County Community Development Department, Lake County Office of Emergency Services, Big Valley Groundwater Sustainability Agency, water purveyors.

Time frame: Midterm (Year 2–5)

Cost: Medium (\$100k–500k)

Financial Options: Federal Emergency Management Agency Hazard Mitigation Grant Program; California Office of Emergency Services Hazard Mitigation Planning grants; City or County general funds.

Action 28.2: Establish technical and financial assistance programs for small water systems to address harmful algal bloom treatment capabilities, backup power systems, and infrastructure hardening against climate impacts.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: County of Lake, City of Clearlake, City of Lakeport

Responsible Agency: Lake County Environmental Health Department

Supporting Agencies/Organizations: Cal Rural Water Association, Lake County Department of Water Resources, Lake County Water Shortage Task Force, local water districts.

Time frame: Midterm (Year 2–5)

Cost: High (\$2 million+)

Financial Options: Safe Drinking Water State Revolving Fund; United States Department of Agriculture Rural Development Water and Waste Disposal Program; California Water Boards Drinking Water State Revolving Fund.

Action 28.3: Continue to support and coordinate with the Big Valley Groundwater Sustainability Agency to ensure long-term groundwater sustainability and monitoring during drought periods.

Applicable Jurisdictions: Lake County

Action Type: Education/Outreach/Coordination

Responsible Agency: Lake County Water Resources Department

Supporting Agencies/Organizations: Big Valley Groundwater Sustainability Agency, California Department of Water Resources, groundwater users.

Time frame: Ongoing

Cost: Low (Less than \$100k)

Financial Options: Sustainable Groundwater Management Act grants; California Department of Water Resources funding; Westside Sacramento Integrated Regional Water Management Plan funding.

Strategy 29: Water Conservation and Drought Resilience for Vulnerable Populations. Expand water conservation programs, retrofit assistance, and drought resilience planning and ensure participation of vulnerable populations, including tribal communities, low-income households, and small domestic water users.

Action 29.1: Implement the Lake County Drought Resilience Plan to assist state small water systems and domestic wells in building resilient supplies and infrastructure. (existing plan)

Applicable Jurisdictions: Lake County

Action Type: Plans/Regulations

Responsible Agency: Lake County Water Resources Department

Supporting Agencies/Organizations: Cal Rural Water Association, domestic well users, small water system operators, County Water Shortage Task Force.

Time frame: Midterm (Year 2–5)/Ongoing

Cost: Medium-High (\$500k–\$2 million)

Financial Options: California Department of Water Resources Drought Planning grants; United States Department of Agriculture Rural Development grants; City or County general funds.

Action 29.2: Coordinate with the Northern California Regional Energy Network to establish low-income assistance programs for water conservation retrofits to help vulnerable households install climate-resilient fixtures, drought-resistant landscaping, and water-efficient appliances.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Programmatic

Responsible Agency: Lake County Community Development Department

Supporting Agencies/Organizations: Lake County Sanitation District, water districts, low-income housing providers.

Time frame: Midterm (Year 2–5)

RESILIENCE STRATEGIES AND ACTION PLAN

Cost: Medium (\$100k–\$500k)

Financial Options: California Low-Income Weatherization Program; United States Department of Agriculture Single Family Housing Repair grants; City of Clearlake Measure V.

Action 30.3: Expand enforcement of the Lake County Water Conservation Ordinance requirements to include updated standards for climate-resilient fixtures and drought-resistant landscaping in new development and major renovations.

Applicable Jurisdictions: Lake County

Action Type: Plans/Regulations

Responsible Agency: Lake County Water Resources Department

Supporting Agencies/Organizations: Lake County Sanitation District, Lake County Community Development Department.

Time frame: Short term (Year 1)

Cost: Low (Less than \$100k)

Financial Options: County or City general funds; building permit fee revenue.

DRAFT



Wetland Integrity

Wetlands provide critical habitat, filter and retain nutrient pollution, store carbon, enhance water quality, control erosion, and provide spaces for recreation. They are local and regional centers of biodiversity that support species found nowhere else across western landscapes. In Lake County, wetlands surrounding Clear Lake and riparian areas along numerous streams provide essential ecosystem services, including water filtration, flood control, carbon sequestration, and habitat for the threatened Clear Lake hitch. Climate change threatens these wetland ecosystems through drought that can cause wetland areas to dry out, extreme heat that exacerbates harmful algal blooms, and altered precipitation patterns that affect wetland hydrology. Functional wetland ecosystems serve increasingly important roles in buffering impacts from extreme climate events and upland disturbances such as flooding and erosion.

Existing Policies and Programs

- **Lake County Resource Conservation District:** Wetland and riparian restoration projects, such as Wright Wetlands Preserve restoration implementation.
- **Clear Lake Environmental Research Center:** Habitat protection coordination and wetland conservation activities.
- **Lake County Watershed Protection District:** Levee and flood control infrastructure maintenance balancing flood protection with wetland preservation.
- **Clear Lake Clean Water Program:** Stormwater management coordination integrating natural wetland systems for water quality improvement.
- **Lake County Development Review Process:** Wetland protection requirements for new development projects.
- **Blue Ribbon Committee for the Rehabilitation of Clear Lake:** 15-member committee with \$22 million in State investments, including wetland restoration activities.
- **Middle Creek Restoration Project:** Comprehensive riparian and wetland habitat restoration.
- **Kuulanapo Wetland Preserve:** Lake County Land Trust wetland preserve providing wildlife habitat along Forbes Creek.
- **UC Davis/Tahoe Environmental Research Center:** Wetland research and monitoring as part of Clear Lake rehabilitation efforts.
- **Tribal EcoRestoration Alliance:** Wetland and riparian restoration projects and invasive species removal.

Identified Gaps

- **Comprehensive Wetland Restoration Program:** No systematic program exists to address climate change impacts on wetlands comprehensively across the county.
- **Wetland and Riparian Habitat Mapping:** Lack of comprehensive assessment of wetland and riparian habitat conditions and climate vulnerability.
- **Integrated Flood Control Planning:** Limited integration between flood control infrastructure maintenance and wetland conservation objectives, such as nature-based solutions, with maintenance triggers needing climate adaptation focus.
- **Dedicated Restoration Funding:** Insufficient dedicated funding streams specifically for wetland restoration projects beyond grant-dependent programs.
- **Recreation-Conservation Balance:** Few sustainable recreation management approaches to protect wetland ecosystems while providing recreational access, with potential to incorporate CalRec Vision principles for balanced recreational planning.

CalRec Vision

The CalRec Vision initiative aims to foster cross-jurisdictional collaboration to advance sustainable outdoor recreation throughout California. The white paper, developed by the Mammoth Lakes Trails and Public Access Foundation in 2020, highlights three fundamental components of sustainability: environmental protection, economic opportunities, and social impact. This framework highlights the need to partnerships across federal, State, regional, and local land management agencies to ensure that outdoor recreation economies can continue to thrive across the State.



Wetland Integrity

GOAL 10: PROTECTED AND RESTORED WETLAND AND RIPARIAN ECOSYSTEMS PROVIDE ESSENTIAL ECOSYSTEM SERVICES, PROVIDE NATURAL CLIMATE RESILIENCE BENEFITS, AND ARE KEY LINKAGES BETWEEN UPLAND AND AQUATIC SYSTEMS IN FORESTED LANDSCAPES.

Strategy 30: Existing Wetland Programs. Strengthen coordination between existing wetland restoration and conservation programs.

Action 30.1: Continue to support, expand, and secure funding for the Middle Creek Restoration Project to serve as a model for comprehensive riparian and wetland habitat restoration and wetland carbon sequestration enhancement capabilities. (existing program)

Applicable Jurisdictions: Lake County

Action Type: Capital Improvement/Infrastructure Projects

Responsible Agency: Lake County Department of Water Resources

Supporting Agencies/Organizations: U.S. Army Corps of Engineers, Middle Creek Restoration Coalition, Lake County Resource Conservation District, California Department of Fish and Wildlife, Blue Ribbon Committee for the Rehabilitation of Clear Lake, Habematolel Pomo of Upper Lake, Robinson Rancheria Band of Pomo Indians of California

Time frame: Ongoing

Cost: High (\$2 million+)

Financial Options: California Wildlife Conservation Board grants; Blue Ribbon Committee state investment allocation; Environmental Protection Agency Wetland Program Development Grants; Wildlife Conservation Board Stream Flow Enhancement Grant; Environmental Protection Agency Clean Water Act Section 319 Nonpoint Source Program.

Action 30.2: Coordinate with the Clear Lake Environmental Research Center and Lake County Watershed Protection District to establish a comprehensive wetland and riparian habitat vulnerability mapping program.

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Evaluation

Responsible Agency: Lake County Resource Conservation District

Supporting Agencies/Organizations: Clear Lake Environmental Research Center, California Department of Fish and Wildlife, US Fish and Wildlife Service.

Time frame: Midterm (Year 2–5)

Cost: Medium (\$100k–500k)

RESILIENCE STRATEGIES AND ACTION PLAN

Financial Options: California Environmental Quality Act mitigation funding; US Fish and Wildlife Service Partners for Wildlife grants; California Wildlife Conservation Board planning grants; California Department of Fish Wildlife Addressing Climate Impacts funding.

Action 30.3: Expand the Clear Lake Wildlife Area and Kuulanapo Wetland Preserve programs to include climate-adaptive management protocols and recreational access planning. (existing program)

Applicable Jurisdictions: County of Lake, City of Lakeport

Action Type: Plans/Regulations

Responsible Agency: Lake County Water Resources Department

Supporting Agencies/Organizations: Lake County Land Trust, California Department of Fish and Wildlife, City of Lakeport Parks and Recreation Department, Clear Lake Environmental Research Center, Lake County Office of Climate Resilience.

Time frame: Midterm (Year 2–5)

Cost: Medium (\$100k–500k)

Financial Options: California Outdoors for All Grant Program; California Wildlife Conservation Board planning grants; City or County general funds.

Strategy 31: Nature-Based Solutions for Flood Control and Stormwater Management. Integrate natural wetland systems into flood control infrastructure and stormwater management programs.

Action 31.1: Expand the Clear Lake Clean Water Program to implement comprehensive stormwater management utilizing natural wetland systems countywide for water quality improvement and flood control. (existing program)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Capital Improvement/Infrastructure Projects

Responsible Agency: Lake County Water Resources Department

Supporting Agencies/Organizations: Clear Lake Clean Water Program, Lake County Resource Conservation District, Clearlake Public Works Department, Lakeport Public Works Department.

Time frame: Midterm (Year 2–5)

Cost: Medium-High (\$500k–\$2 million)

Financial Options: Environmental Protection Agency Section 319 grants; California Stormwater Grant Program; Wildlife Conservation Board Stream Flow Enhancement Grant; Safe Drinking Water State Revolving Fund; CDFW Addressing Climate Impacts funding.

Action 31.2: Update development review processes to require nature-based stormwater management standards and climate resilience criteria. (existing plans)

Applicable Jurisdictions: County of Lake, City of Clearlake, City of Lakeport

Action Type: Plans/Regulations

Responsible Agency: Lake County Community Development Department, Clear Lake Community Development Department, Lakeport Community Development Department.

Supporting Agencies/Organizations: Lake County Environmental Health Department.

Time frame: Midterm (Year 2–5)

Cost: Low (Less than \$100k)

Financial Options: City or County general funds.

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Achieving Resilience

Implementation of the Climate Adaptation Plan will require sustained collaboration, funding, and ongoing monitoring to ensure that actions remain effective under evolving climate conditions. Next steps will include coordination with the Lake County Office of Climate Resilience and Lake County Community Risk Reduction Authority to guide implementation of the Climate Adaptation Plan. Ongoing engagement with Tribes, community-based organizations, and the public will ensure that adaptation efforts remain inclusive, equitable, and aligned with Lake County's long-term resilience goals.

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GLOSSARY

Action: A specific implementation measure that carries out a strategy. Actions include detailed information on applicable jurisdictions, responsible agencies, supporting organizations, timeframes, costs, and funding sources to support implementation by staff and community partners.

Adaptation: Making changes in response to current or future conditions (such as the increased frequency and intensity of climate-related hazards), usually to reduce harm and to take advantage of new opportunities.

Adaptive Capacity: The combination of the strengths, attributes, and resources available to an individual, community, society, or organization that can be used to prepare for and undertake actions to reduce adverse impacts, moderate harm, or exploit beneficial opportunities.

Cascading or Compounding Effects: Extreme events that link together hazards over days, weeks, or months, resulting in multiplied effects that cause secondary and sometimes tertiary damage, exceeding the damage of the initial hazard event.

Climate Change: A change in the state of the climate that can be identified by changes in the mean, and/or the variability, of its properties, and that persists for an extended period, typically decades or longer.

Carbon Sequestration: The process of storing carbon dioxide in locations other than the atmosphere, where it cannot contribute to climate change or ocean acidification. For the purposes of this plan, carbon sequestration refers to nature-based carbon removal through the storage of atmospheric carbon in vegetation, soils, woody products, and aquatic environments.

Community Asset: A valued feature of a community that may be harmed by climate change. Community assets may include buildings, infrastructure, community services, ecosystems, and economic drivers.

Community Risk Reduction Authority: A joint powers authority formed in 2023 that brought together Lake County, the cities of Clearlake and Lakeport, fire protection districts, water districts, the Lake County Watershed Protection District, and four tribal governments to collaborate on climate resilience planning.

Exposure: The presence of people, infrastructure, natural systems, and economic, cultural, and social resources in areas that are subject to harm.

Goal: An ideal future end state related to community resilience.

Hazard: An event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, damage to the environment, interruption of business, or other types of harm or loss.

Impact: The effects (especially the negative effects) of a hazard or other conditions associated with climate change.

GLOSSARY

Lake County 2050: The comprehensive update to Lake County's General Plan, developed concurrently with the Climate Adaptation Plan to ensure integrated planning and community engagement.

Pillars of Landscape Resilience: A framework adopted by Lake County's Office of Climate Resiliency in 2022 that addresses resilience through ten interconnected pillars: air quality, biodiversity conservation, carbon sequestration, economic diversity, fire-adapted communities, fire dynamics, forest resilience, social and cultural well-being, water security, and wetland integrity.

Resilience: The capacity of any entity—an individual, a community, an organization, or a natural system—to prepare for disruptions, to recover from shocks and stresses, and to adapt and change from a disruptive experience. Community resilience is the ability of communities to withstand, recover, and learn from past disasters to strengthen future response and recovery efforts.

Resilience Centers: Community-serving facilities upgraded to provide local communities with shelter, water, and electricity during climate-related events or disasters.

Risk: The potential for damage or loss created by the interaction of hazards with assets such as buildings, infrastructure, or natural and cultural resources.

Strategy: A general policy meant to reduce climate-related risks and increase resilience across communities, infrastructure, and natural systems

Vulnerability: The degree to which natural, built, and human systems are susceptible to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt.

Vulnerability Analysis: An assessment of how a changing climate may harm a community and which elements—people, buildings and structures, resources, and other assets—are most vulnerable to its effects based on an assessment of exposure, sensitivity, potential impact(s), and the community's adaptive capacity.

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